NATIONAL CAR BUILDER

VOLUME XV.
NUMBER 2.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

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FEBRUARY, 1884.
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With Automatic Electric Locking, without which no interlocking is safe.
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Compiled for the Master Car-Builders' Association by M. N. FORNEY, *assisted by* LEANDER GAREY *and* CALVIN A. SMITH.

It contains an alphabetical list of about 2,500 words and their definitions, covering 188 pages and 800 engravings, which occupy 300 pages more, the whole book having 490 pages. A large proportion of the engravings are made to a scale and illustrate all the different parts of railroad cars, and nearly all kinds of railroad cars in use in this country, forming the most complete collection of illustrations of the subject ever published, and being the only book on American railroad cars in existence. 800 engravings, 490 pages; size, 5¼ × 8 inches. Price, $2. Address, CAR-BUILDER, New York.

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All the prominent roofers are using it. Send for samples and prices.

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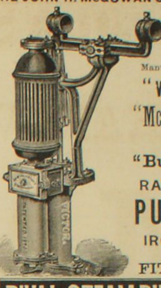

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FIFTEENTH YEAR,

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AMONG

Managers, Superintendents, Purchasing Agents, Master Mechanics, Master Car-Builders, and Business Men Generally

IN THE UNITED STATES AND CANADA.

OVER 6,000 NEW SUBSCRIBERS IN ONE YEAR.

Advertisers will receive more returns for their money in the CAR-BUILDER than any other railroad paper. We can refer to many of the leading manufacturers in the country, who are now using the paper, by the following Letters taken from a large number received by us:

GOODELL & WATERS,
WOOD WORKING MACHINERY, 3,101 Chestnut Street, Philadelphia, Pa.

NATIONAL CAR-BUILDER, 140 Nassau Street, New York:

Gentlemen: It gives us great pleasure to say that among the many R. R. journals in which we have advertised during the past three years (all of them good), we have derived more direct benefit from THE NATIONAL CAR-BUILDER than from any other R. R. journal. We hope to remain with you as long as you continue to publish so well conducted and able a R. R. paper.

Yours respectfully (signed) GOODELL & WATERS.

NAT'L CAR SPRING CO.,
RICHARD VOSE, President, 13 Barclay Street, New York.

NATIONAL CAR-BUILDER:

Gentlemen: In renewing our advertisement in your valuable journal for the ensuing year, we desire to say that we feel that it has been of greater value to us in the sale of our Springs than all the other R. R. papers combined. Fifteen years' use of your columns to bring our Manufactures to the notice of the R. R. Officials permits us to know whereof we speak.

(signed) NAT'L CAR SPRING CO., by RICHARD VOSE, President.

Also to a large number of railroad men who do the buying business for railroads, and could print over 100 letters like the following:

THE N. Y. CENT. & HUDSON RIV. R. R. CO.,
Office SUP'T CAR DEP'T, GRAND CENT. DEPOT, ROOM 19, LEANDER GAREY, Superintendent, New York, Jan., 1884.

R. M. VAN ARSDALE, PROP. NAT'L CAR-BUILDER, N. Y:

Dear Sir: Inclosed please find my subscription for another year. Having perused with much interest each number of the CAR-BUILDER for the last 14 years, must say that I have failed to find a single number that has not been both interesting and instructive, and think all railroad men who may read the paper will be benefited by it.

Yours truly, (signed) LEANDER GAREY.

BALTIMORE AND OHIO R. R. CO.,
Office of MASTER CAR-BUILDER, L. PACKARD, Master Car-Builder, Baltimore, 1st Jan., 1884.

R. M. VAN ARSDALE, ESQ., PROP. NAT'L CAR-BUILDER:

Dear Sir: As renewals of subscriptions for periodicals are in order at this time, and in renewing mine I think no better opportunity is likely to occur than now for me to say that I have noted with pleasure the steady, healthy growth of your paper, as I have read it for at least ten years past, and think it contains matter on various subjects that will make it almost indispensable to officers of R. R. Co's, especially in the operating departments. With the compliments of the season, I am,

Very truly yours (signed) L. PACKARD.

BOSTON & ALBANY R. R. CO., ALLSTON, MASS.

R. M. VAN ARSDALE, ESQ., PROP. NATIONAL CAR-BUILDER, New York:

Dear Sir: Inclosed please find one dollar in renewal of my subscription to your paper. I am much pleased with its manifest improvement during the past year, making it more and more valuable for the information it contains in the interests of railway rolling stock; and I also think it is the best paper for the use of business men in reaching the supply departments of railroads. Wishing you continued success,

I am, yours truly, F. D. ADAMS, Master Car-Builder Boston & Albany R. R.

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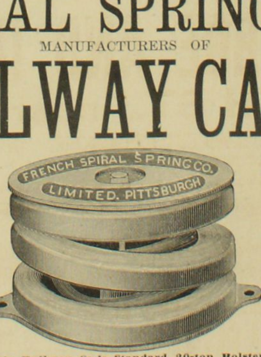

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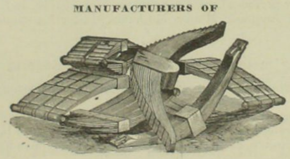

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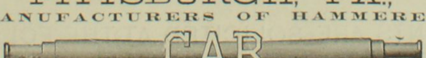
MANUFACTURERS OF HAMMERED



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LOCOMOTIVE AXLES

We make a Specialty of our well-known brand of Railway Axles marked "Special" from new iron, guaranteed to be purely fibrous, and to stand the regulation drop test of the Penna. R. R. Company.

ALSO,

BAR IRON & BOLTS,

Channel and Angle Iron, Bridge Bolts, plain and upset ends, all sizes, Track Bolts, Square and Hexagon Head Bolts, Rivets, Washers, Fish Plates, Etc.

NATIONAL CAR-BUILDER SUPPLEMENT

AND EXPORT EDITION.

At the request of prominent Railroad officials and others, we commenced three years ago the compilation of accurate lists of the American Manufacturers of Railroad Rolling Stock and Materials, published them in the form of a Supplement to the National Car Builder, and distributed it gratuitously to every official in the Purchasing and Mechanical Departments of every Railroad in the United States, Canada, Mexico, Central and South America, West Indies, Australia, New Zealand, and such other foreign countries as could buy Railroad Material in the United States with advantage. Although the undertaking involved an amount of labor and expense that was not anticipated, the outlay was fully warranted by the very flattering reception it received by Railroad men and the business community generally.

We are now preparing the FOURTH ANNUAL "SUPPLEMENT AND EXPORT EDITION," and it will contain as follows:

Complete lists of every Car and Locomotive Builder, Axle, Car Wheel and Car Spring Manufacturer in the United States and Canada.

All the Rail Mills of the country.

Complete lists of the Street Railroads in the United States and Canada, their Gauge, Weight of Rail, Mileage, Number of Cars and Horses, Officers' Names and Addresses.

The Railroads (both Steam and Street) in Mexico, Central and South America, the West Indies, Australia, New Zealand, with the Gauge, Weight of Rail, Mileage, number of Cars and Locomotives, Officers' Names and Addresses, &c.

THIS IS THE ONLY PUBLICATION THAT HAS EVER GIVEN THIS INFORMATION.

It will be distributed *gratuitously* to every person whose name appears in the paper, and in addition will be sent to every General Manager, Superintendent, Purchasing Agent, Chief Engineer, Master Mechanic, Master Car-Builder and Road Master of all Railroads in the United States and Canada.

The Supplement is the ONLY advertising medium which reaches street Railroad Officers, and is the BEST and CHEAPEST means of reaching Railroad Officers in adjacent foreign countries.

It is the experience of the publishers, during the past three years, that Railroad men and others keep the "Supplement" on their desks or hung near at hand throughout the year for reference, not only for the lists, but for the advertisements, which form a conveniently indexed collection of trade circulars of nearly TWO HUNDRED of the best and most responsible manufacturers of railroad material—a collection not to be obtained in any other way.

As to its value as an advertising medium, we respectfully refer to a few of the prominent manufacturers who have used its pages, as follows:

Adams & Westlake Manufacturing Co., R. R. Supplies, Chicago, Ill.
Allen Paper Car Wheel Co., Car Wheels, New York and Chicago.
Baldwin Locomotive Works, Philadelphia, Pa.
Baltimore Car Wheel Co., Car Wheels, Baltimore, Md.
Bickford, H., Upright Drills, Cincinnati, O.
Bradley & Co., Power Hammers, Syracuse, N. Y.
Brill, J. G. & Co., Cars, Philadelphia, Pa.
Brownell & Wight Car Co., Street Cars, St. Louis, Mo.
Chilled Car Wheel Grinding Co., Chicago, Ill.
Cliff & Righter Co., Car Springs, Oswego, N. Y.
Congdon Brake Shoe Co., Chicago, Ill.
Detroit Car Spring Co., Detroit, Mich.
Devoe, F. W. & Co., Paints and Varnishes, New York, N. Y.
Fairbanks & Co., Scales, New York, N. Y.
Fay, J. A. & Co., Wood Working Machinery, Cincinnati, O.
French, A. & Co., Car Springs, Pittsburgh, Pa.
French Spiral Spring Co., Car Springs, Pittsburgh, Pa.
Goodell & Waters, Wood Working Machinery, Philadelphia, Pa.
Hancock Inspirator Co., Injectors, etc., Boston, Mass.
Hathaway, Charles, Street Railway Contractor, Cleveland, O.
Hopkins, D. A., Journal Bearings, New York, N. Y.
Howard, James L. & Co., R. R. Supplies, Hartford, Conn.
Helmbacher Forge and Rolling Mill Co., St. Louis, Mo.
Iron Clad Paint Co., Metallic Paints, Cleveland, O.
Jones Car Manufacturing Co., Cars, Schenectady, N. Y.
Maher & Brayton, Car Wheels, Cleveland, O.
Meeker, A. B. & Co., Pig Iron, Chicago, Ill.
Midvale Steel Co., Axles, etc., Philadelphia, Pa.
National Car Spring Co., Car Springs, New York, N. Y.
Northwestern Horse Nail Co., Horse Nails, Chicago, Ill.
Penfield Block Co., Tackle Blocks, Lockport, N. Y.
Pennsylvania Steel Co., Philadelphia, Pa.
Porter, H. K. & Co., Locomotives, Pittsburgh, Pa.
Rogers, C. B. & Co., Wood Working Machinery, Norwich, Conn.
Stephenson, John Co., Street Cars, New York, N. Y.
Sweet's Manufacturing Co., Toe Calks, etc., Syracuse, N. Y.
Union Brass Manufacturing Co., Car Trimmings, etc., Chicago, Ill.
Valentine & Co., Varnishes, New York, N. Y.
Westinghouse Air Brake Co., Pittsburgh, Pa.
Westinghouse Machine Co., Engines, etc., Pittsburgh, Pa.
Whitney & Sons, Car Wheels, Philadelphia, Pa.
Wilson, Walker & Co., Forgings, Pittsburgh, Pa.

☞ A sample copy of the above paper will be sent on application.

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One full page, 14 inches deep and 9½ inches wide, $150; three-quarters of page, $125; half page, $100; quarter page, $75; smaller spaces, $10 for first inch and $5 for each additional inch (single column).

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NATIONAL CAR-BUILDER "SUPPLEMENT,"
Morse Building, 140 Nassau Street, New York.

UNION STONE COMPANY,

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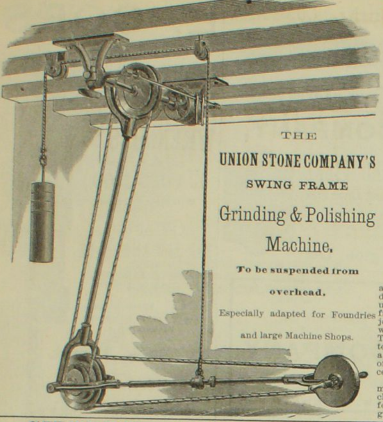
PATENTEES AND MANUFACTURERS OF THE

UNION EMERY WHEEL.



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To be suspended from overhead.

Especially adapted for Foundries and large Machine Shops.

Emery Wheel Machinery and Tools a Specialty.

Automatic Knife-Grinding Machines.

WOOD-POLISHING WHEELS,

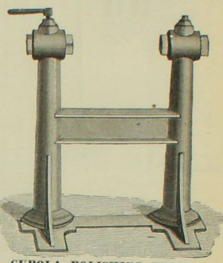
EMERY, QUARTZ, CORUNDUM,

GRINDERS' AND POLISHERS' SUPPLIES.

Catalogue on Application.

The work is placed on the floor, bench or truck, the emery wheel is swung at will to conform to the straight or uneven surface. The wheel, being driven from a swinging countershaft, suspended by a telescopic rod with a universal joint, may be carried back and forth or swung at will; and the frame carrying the wheel being also suspended by the counterpoise weights jointed to a similar horizontal telescopic rod, makes it easy to twist the wheel over to any angle or give it any range of movement up or down. The operator can seize the handles on each side of the wheel, and carry it to any portion of the work desired. A boy can operate it. By substituting a circular "Scratch Brush" for the wheel, its value in the cleaning room of a foundry is apparent to all familiar with the old laborious hand process.

The machine is also a valuable accession to the machinery of any general machine shop, for grinding off fins, spurs and imperfections, instead of chipping and filing. It leaves the work looking better, and may be performed by a cheaper hand; and by substituting a polishing wheel for the grinding wheel, the work can be finished to a fine polish.



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GILBERT CAR MANUFACTURING COMPANY, TROY, N. Y.

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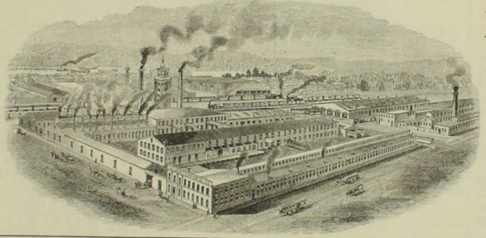

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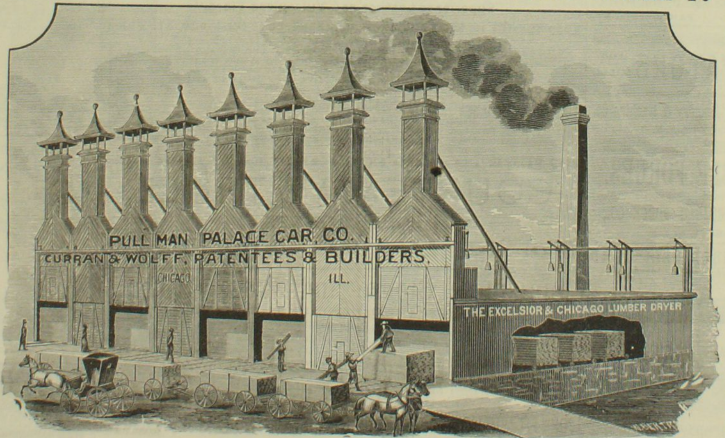
PAYS FOR ITSELF EVERY YEAR.

Storing Capacity, 40,000 Feet Inch Lumber.


PULLMAN PALACE CAR CO.
CURRAN & WOLFF, PATENTEES & BUILDERS.
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ILL.
THE EXCELSIOR & CHICAGO LUMBER DRYER

DRYING 8,000 FEET PINE LUMBER EVERY 24 HOURS.

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Norfolk & Western R. R. Co., Roanoke, Va	2	Louisville & Nashville R. R. Co., Louisville	2	Southern Car Co., Car-Builders, Knoxville, Tenn	1
Wilmington & Weldon R. R. Co., Wilmington, N. C	2	Pullman Palace Car Co., Chicago	8	Georgia Car Co., Car-Builders, Cartersville, Ga	1
Denver & Rio Grande R. R., Denver, Col	2	Wells & French Co., Car Builders, Chicago	3	Gilbert & Bush Co., Car-Builders, Troy, N. Y	1
A. T. & S. Fe R. R., Topeka, Kan	2	Michigan Car Co., Car-Builders, Detroit, Mich	2	Ensign Mfg. Co., Car-Builders, Huntington, W. Va	3
Flint & Pere Marquette R. R. Co., Saginaw, Mich	1	Ohio Falls Car Co., Car-Builders, Jeffersonville, Ind	2	Peninsular Car Works, Car-Builders, Detroit, Mich	2
C., M. & St. Paul R. R. Co., Minneapolis, Minn	2	Barney & Smith Mfg. Co., Car-Builders, Dayton, O	4	Northern Pacific R. R., Brainerd, Minn	2
Memphis & Charleston R. R. Co., Memphis, Tenn	1	Jackson & Sharpe Co., Car-Builders, Wilmington, Del	2	R. & D. R. R., Richmond, Va	2

D. L. WELLS, President. W. B. SHULTE, Vice-President. H. L. NORTON, Sec. and Treas. F. E. WALKER, Engineer

WELLS & FRENCH CO., BRIDGE AND CAR-BUILDERS, CHICAGO, Nov. 13, 1880.

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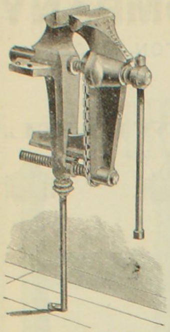

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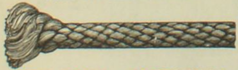

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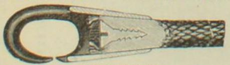

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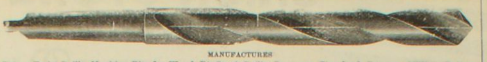

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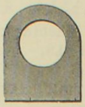

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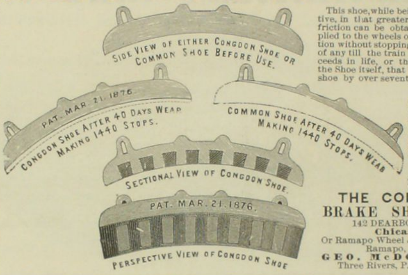

SIDE VIEW OF EITHER CONGDON SHOE OR COMMON SHOE BEFORE USE.
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CONGDON SHOE AFTER 40 DAYS WEAR MAKING 1440 STOPS.
COMMON SHOE AFTER 40 DAYS WEAR MAKING 1440 STOPS.
SECTIONAL VIEW OF CONGDON SHOE.
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This shoe, while being more effective, in that greater uniformity of friction can be obtained when applied to the wheels of a train in motion without stopping the revolution of any till the train is at rest, exceeds in life, or the durability of the Shoe itself, that of the cast iron shoe by over seventy-five per cent.

Its durability, together with cheapness and simplicity of construction, recommend it in preference to any other in use

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GEO. McDOUGALL,
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GELATINIZED FIBRE FLEXIBLE DUST-GUARDS.

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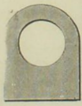
Keep the Oil in the Car-Boxes and Sand and Dust out of Them



They are not affected by oil, grease or petroleum; do not cut the axles, as grit does not adhere to them; keep their shape well and will outwear several leather ones. Cut to order of any desired thickness or pattern. Send drawing or sample for estimate. This material **is absolutely free from grit, and will not become brittle and break.**

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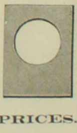

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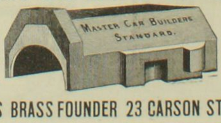

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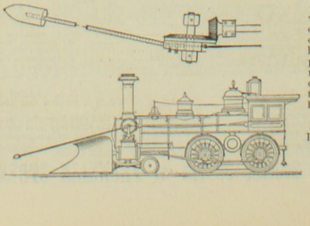

The spar is turned from cab window to front of plow by a crank inside of cab. In front of cab window is a wicket in lower panel, where torpedo is placed on end of spar. It is then raised, and describing a half circle, is lowered over centre of track and exploded in snowbank.

For descriptive circulars and particulars address

GEO. A. GUNTHER,
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New Utrecht, N. Y.

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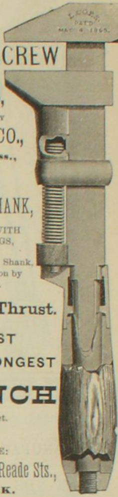

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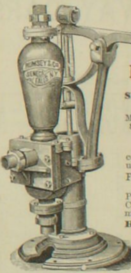

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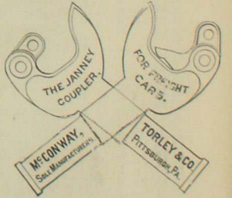

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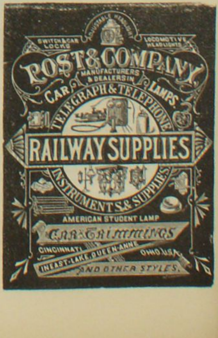

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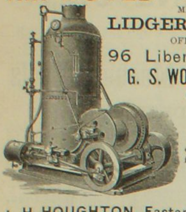

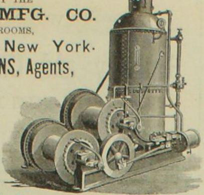

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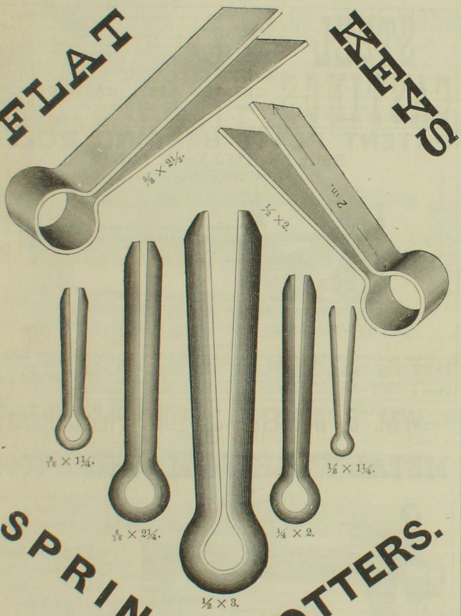
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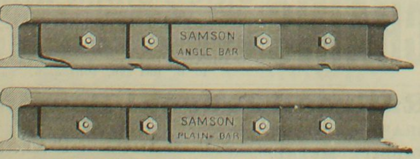

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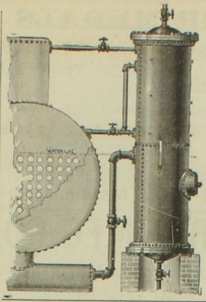

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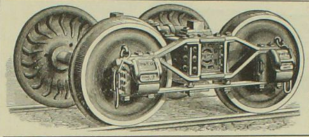

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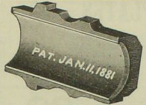

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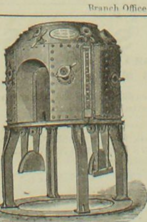

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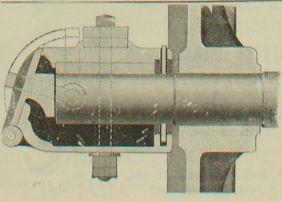

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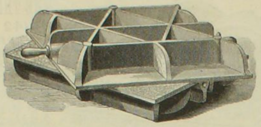

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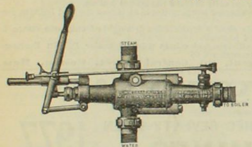

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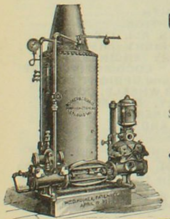

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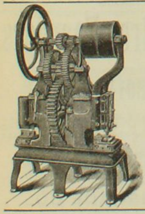

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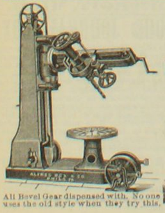

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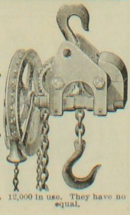

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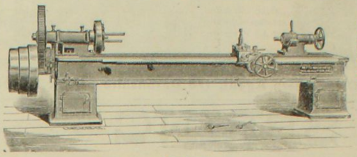

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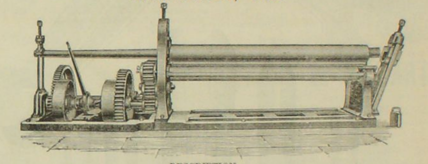

DESCRIPTION.

The annexed cut represents all sizes we make to be driven by belt. It will be seen at once that it is but the work of a moment to balance the top roll and lower the hinge housing, to take out the plate when a full circle is bent. The rolls are all made of Solid Wrought Iron, the Balance Bar being a part or extension of the top roll. There is a Cast-Iron Bed-Plate under the entire machine. To save any shifting of belts we put in Friction Pulleys, which enable the rolls to be started, stopped or reversed instantly.

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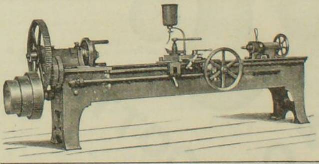

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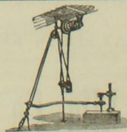

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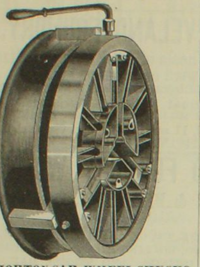

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This cut represents the Horton Car Wheel Chuck holding a car wheel in proper position for boring, the flange and tread of the wheel assuming a true position on the jaws.

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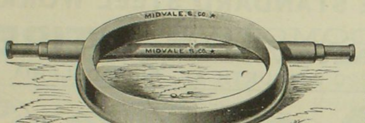

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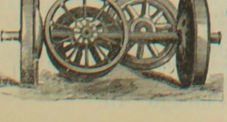

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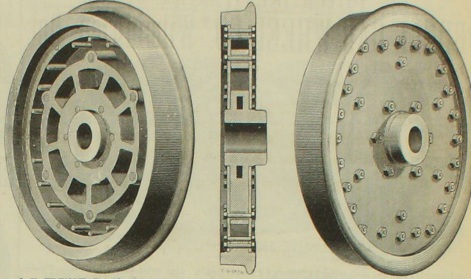

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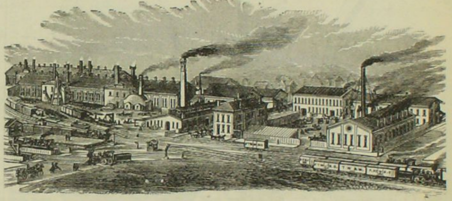

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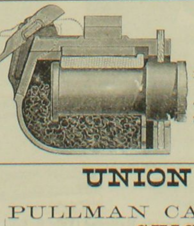

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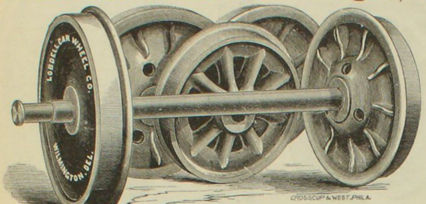

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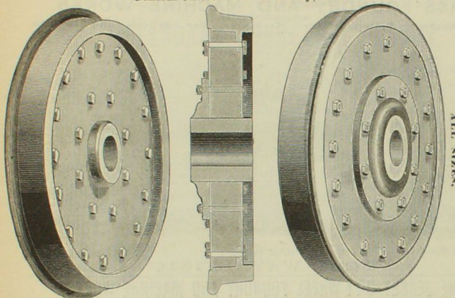

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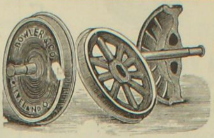

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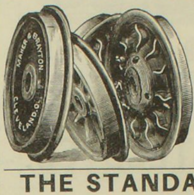

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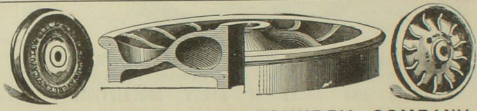

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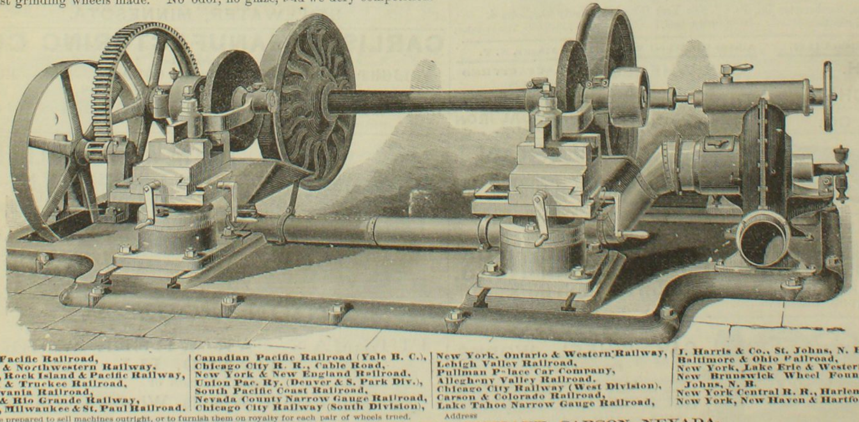

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It will True (boring simultaneously) a chilled iron wheel in less time and deprive its tread of less of its integrity than any other Truing Machine in existence.

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It will Bore a Chilled-Iron or Steel-tired Wheel *without truing the tread*, or True the tread *without boring;* embodying in combination, or independently, all the requisites of a Boring Mill, Chilled Car Wheel Grinding Machine and Tire Lathe.

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That if circumferentially matched, rough Cast Wheels are bored and pressed upon their axle, one wheel of the pair being more oval than its fellow, and becoming the smallest of the pair, when both are reduced to a round, the best wearing surface must necessarily be cut from the chilled tread of the other, and best wheel, in order to make it conform in size to its mate.

It prepares the wheel for its axle; circumferential *admeasurement for pairing being made after wheels are bored and trued.*

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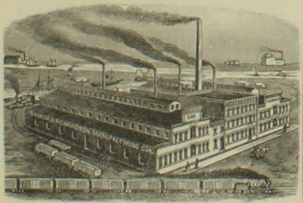
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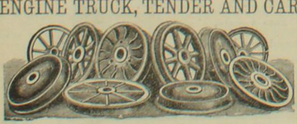

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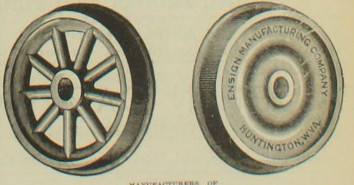

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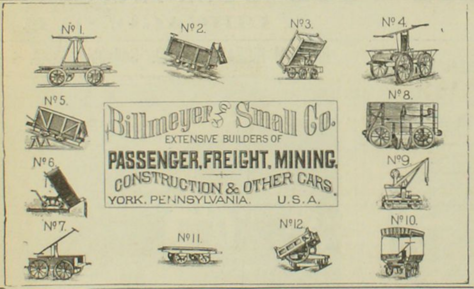
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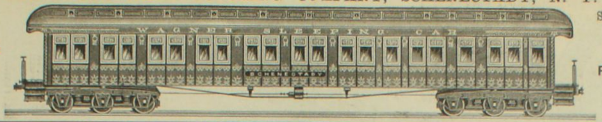

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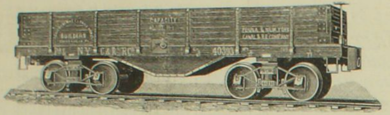

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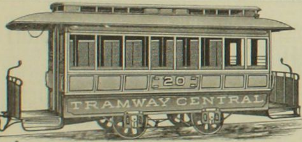

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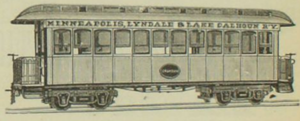
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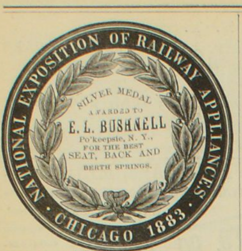

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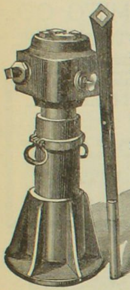

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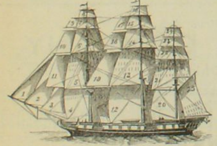

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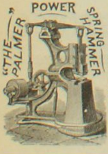

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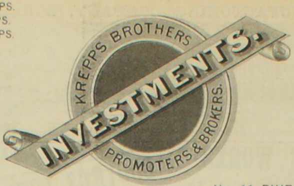

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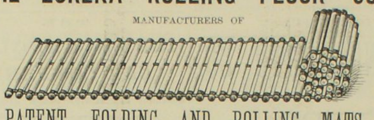

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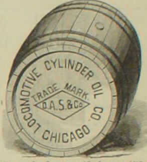

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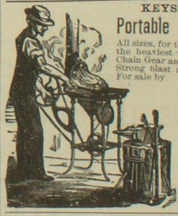

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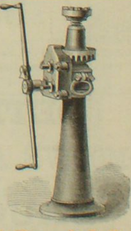

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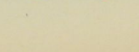

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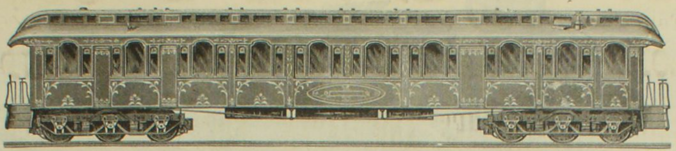

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VOLUME XV. NUMBER 2.

FEBRUARY, 1884.

SINGLE NUMBERS, TEN CENTS. $1.00 PER ANNUM.

Miscellaneous Items.

The Terre Haute Car Works are engaged on an order for 1,000 freight cars for the Missouri Pacific Railroad.

The Muskegon (Mich.) Car and Engine Company has received an order to build 500 box cars for the Nickel-Plate road.

Leve & Alden, the popular excursion managers, have built two of their combined parlor and sleeping cars for the Florida Transit & Peninsular road.

Tramway cars in Milan, Italy, are lighted with electricity, and it is said that some of the tramway cars in London are to be lighted in the same way. Why not try it on the steam cars?

The Laconia Car Co. has received a contract from the government of New Zealand. The first order calls for 100 open freight cars, which order is to be increased to 500 of the same pattern, to be delivered in Boston on April 1st ready for shipment.

The car shops of the Utah and Northern Division of the Union Pacific road at Eagle Rock, Idaho, are full of work. They are at present engaged on 50 new box cars that are to have a carrying capacity of 30,000 pounds. A new baggage car, 42 ft. by 8 ft 2 in., has just been completed. The road is putting Miller platforms on all its passenger cars and double brakes on its freights cars.

The Empire Portable Forge Co., of Cohoes, N. Y., (the oldest manufacturers of portable forges in the United States) have issued a new catalogue and price list, containing illustrations of the various styles of forges and blowers of their manufacture: and also a special Telegraphic Code, by which a great saving of words is effected in the transmission of orders and in conducting business correspondence.

A Shop foreman informs us that he has for a long time measured the wheels on the same axle when one of them had a cut flange, and has invariably found that the opposite wheel, or the one with an unworn flange, is the smallest; also, that when wheels on the same axle are very much coned, one or the other, or both alternately, will crowd against the rail; hence he believes that square treads are the best.

The Philadelphia & Reading Railroad Co. is making extensive preparations to handle an extensive anthracite coal tonnage this year. In connection with these preparations a contract has been placed with the car shops of the company at Reading for 250 new coal cars, which will be commenced as soon as the material has been procured. An order for 500 coal cars has just been completed at the same shops.—*Railway World.*

An engineer, conductor and brakeman of the Delaware & Hudson Canal Co. certify that the Archer Automatic Car Coupling has been in use on that road for several months, and has never missed in coupling, and that they consider it the best device of the kind ever put on a freight car. It is manufactured by the Archer Automatic Car Coupler Co., of Saratoga Springs, who may be addressed for information in regard to it.

A Car Trust, owned by the Pittsburgh & Western; Pittsburg, Cleveland & Toledo; and the Wheeling & Lake Erie companies, has closed a contract with the Lima and Youngstown car companies for the construction of 1,000 cars, one-half box and half gondola, which will be used by a new freight line which will operate between the coke regions and the Northwest. Work on the contract begins at once, and the cars will be turned out as fast as possible.—*Railway World.*

For a week or two past there has been considerable trouble on the Cincinnati, Indianapolis, St. Louis & Chicago road from broken flanges on the wheels of passenger trains. The inspectors at Indianapolis, according to the Indianapolis *News*, have found wheels with broken flanges under one engine truck, four mail cars and three passenger cars. It was decided that the trouble must be caused by a frog somewhere, and a careful search by the Road Master revealed one at Lawrenceburg which was a little out of place, so that the wheel flanges struck it in passing.

More business was done at the Baldwin Locomotive Works last year than at any time in their history. The immense capacity of the works was kept well employed, and the result is a total of 557 locomotives turned out, equal to 800 of the old pattern; 145 of these were of the consolidation type, with four pairs of driving-wheels, and moguls with three pairs, which are now largely in demand, instead of the old style with two pairs, as formerly. The exports foot up 151 locomotives, distributed among the following countries: Mexico, Brazil, Argentine Republic, Australia, Cuba, West Indies, Central America, Sandwich Islands and Peru.—*Railway World.*

Akron, O., has a new enterprise—the manufacture of a newly-patented electric headlight for locomotives. The invention lies in a perfect double pendulum and counterpoise, which renders it impossible for the carbons to touch for more than an instant, and this is attached to the clockwork. The feeding of the upper carbon is controled by the counterpoise. When the carbon is so low down as to form a continuous circuit, a magnet raises the counterpoise. This stops the feeding of the carbon, which burns enough to weaken the current. Then the counterpoise drops back, starting the feeding again. The double pendulum renders it impossible for the light to go out.—*Age of Steel.*

The Westinghouse Air Brake Company has recently obtained a patent for an arrangement of the hose-pipes between the cars in connection with the automatic brake, the use of which will prevent the application of the brakes by the bursting of any one hose. With this arrangement trains will never be stopped by the bursting of hose, because it requires two pieces of hose between each car to burst at the same time to empty the brake pipe. By the use of this arrangement the hose pipes can be kept in use until they are actually ruptured; whereas, without it, the hose must be examined *and removed if they appear to be defective.* Cars provided with the double couplings can be run in connection with cars provided with the single coupling.—*Railway World.*

The *Timber Trades Journal*, of London, in a recent review of the timber trade in England, says: "After all, what is the drain on the pine regions of the West compared with what has been going on for hundreds of years in Europe, when wood was the only material for house and ship building, while also forming the chief supply of fuel? Granted, the consumption all over the world has immensely increased, but so have the sources of supply. It suits the large timber producing countries to take up the cry of 'forest exhaustion,' but since the subject was prominently brought before the trade in the pages of this journal seven years ago—when Mr. Little was agitating the matter—no response has come from the trade on this side, and values are not a whit firmer, nor is the market any more inclined to exalt prices, while the timber is always to be had in quantities quite sufficient to meet the demand."

Mr. Patrick Reilly, of Mattoon, Ill., Master Mechanic of the Peoria, Decatur & Evansville R. R., has patented a device to be used in connection with air brakes, and specially applicable to the Westinghouse automatic brake, the object of which is to provide for the instantaneous release of such brakes when they become set from accidental causes, thus obviating the necessity of going under the cars and letting the air out of the reservoirs. The invention consists of an attachment to the brake apparatus of an additional line of pipe which serves as a safety-exhaust from the auxiliary reservoirs in cases of emergency. This additional pipe is connected with the air reservoirs by suitable cocks, and is also extended by means of the usual pipe couplings to the cab of the locomotive, so that the engineer has immediate control of it, and can release the brake pressure from the wheels without a moment's delay. The details of its application can not be clearly set forth without the aid of drawings.

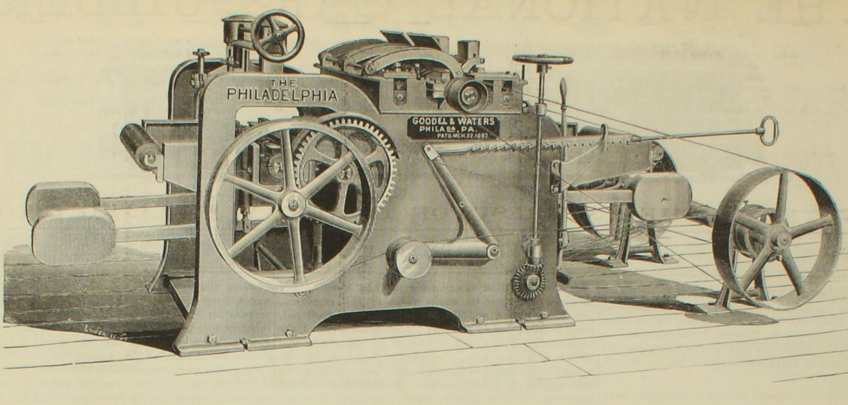
The Asphalt Car Roofing Co., of Philadelphia, has issued a circular announcing that it is prepared to furnish a new kind of material for freight car roofing which is practically imperishable. It consists of a combination of paper and asphalt, the paper forming the substantial body, but which is saturated by a peculiar process with asphalt, and is thus rendered exceedingly durable, so much so as to resist any tendency to decay or to become impaired by extremes of temperature. The asphalt paper is placed between the upper and lower boarding, where it is protected from external injury, and being painted with a preparation of asphalt, is not affected by the gases and moisture that prove so destructive to metallic roofs. It can be furnished on the cars at "nearly the cost of a double board roof," which means, we suppose, that it costs a little more than a double board roof. It is claimed that it will last as long as a car will, and that the roofing has been in use on cars for over three years, and is now in perfect condition.

The Raleigh (N. C.) *State Chronicle* says that the North Carolina Car Co., which was organized in that city in February, 1882, built during the past year several narrow-gauge passenger coaches, and have since completed a lot of narrow-gauge box cars of 26,000 pounds capacity. The company is now building a lot of flat cars for the Raleigh & Gaston road. The shops of the company are well equipped with new and improved machinery, purchased of Goodell & Waters, of Philadelphia. Car loads of long-leaf yellow pine, shipped from the saw-mills sixty miles away, are run into the shops directly to the machines. The company also manufacture sash, doors and blinds from Southern pine; and so successful has this branch of the business become that white pine articles of this class have almost disappeared from the markets in the vicinity. The range of work is to be extended, and the company will soon solicit orders for cars from the North. As an evidence of its successful management a dividend will be declared by the board of directors before the annual meeting of the stockholders. Gen. R. F. Hoke is President of the company, and Mr. W. E. Ashley Superintendent.

The experiments of electricians in regard to the transmission of power by means of electricity have been so successful as to cause a great deal of speculation in regard to its possible applications in future. The small size of the conductors necessary for the transmission of a considerable amount of power great distances is so small, and the losses in the transmission have been so much reduced, that where coal is cheap or where water power can be obtained, electricity seems to be already available for the purpose named. For the propulsion of cars on street railways or across the East River Bridge, and for many other purposes, the dynamo seems to be capable of easy adaptation. It has even been proposed, and with very good grounds for believing it possible, to apply the dynamo to each axle of a car, and in this way dispense with the weight of the locomotive, thus utilizing the weight of the train and the adhesion of the car wheels. These, however, are mere possibilities, and depend upon the future development of the subtle agent the inherent properties of which are so mysterious. It may in time become a very important factor in railway progress in ways that are not now anticipated, but not to the extent that is predicted by many enthusiastic people.

New Stock Cars.

The Boston *Advertiser* says that the new "Lincoln" stock cars, recently built at the Allston shops of the Boston & Albany Railroad, arrived at Brighton, a suburb of Boston, on Tuesday morning, January 15, from Chicago, loaded with cattle, this being the first trial trip. The train consisted of 30 cars, and left Chicago Friday noon, making the trip in 88 hours. The cattle were not unloaded from the time they left Chicago until they arrived at Brighton, and when they came out of the cars they appeared as fresh as when loaded in Chicago. They were fed and watered several times during the trip, arrangements which the cars provide, and the drovers who came with the cattle report that every thing worked satisfactorily. The quickest run the train made was over the New York Central, from Buffalo to Albany, 300 miles, in 14 hours. From Albany to Brighton, about 200 miles, the running time was 19 hours. The cars are 34 ft. 4 in. in length, and, with 16 cars to a train, it will admit of a portion of them lying down without being trampled upon. The hay can be put in through doors on top of the car, and the arrangements for watering are galvanized iron troughs on each side of the car, which can be filled from water-tanks, and when they are not in use can be turned over out of the way.



ENDLESS-BED DOUBLE-SURFACING WOOD-WORKING MACHINE.

The engraving represents an improved endless-bed double surfacer, built by Goodell & Waters, Philadelphia. The machine throughout is very heavy and durable. It is adapted for a fine as well as a heavy class of work. Endless-bed machines were long kept from being manufactured, at first from jealousy of the Woodworth combination, then from ignorance and prejudice; but now have acquired a place in the market from which it would be difficult to dislodge them. They were represented by competitors as coarse and bungling, and were only supposed to be fit for the roughest and coarsest work. Consequently they were avoided by a large proportion of the trade, and timber planing was left to the slow process of the Daniels or "Dimension" planers.

This machine will plane from ⅜ inch to 12 inches thick and 26 or 30 inches wide, as may be ordered.

It has the Goodell Patent Independent Pressure Rolls; ten rolls acting independently, by which boards of unequal thickness may be fed through simultaneously at the same rate of speed. The rolls are made of different diameters, the large part of one being opposite the small part of the other, the largest part of each roll feeding lumber on its side of the machine. The small diameter of the other roll being raised above the lumber is not affected by it, thus enabling the planer to feed lumber varying half an inch in thickness. It is the only practical device for such work, and as the rolls are solid, without breaks or joints, are just as durable as the ordinary kind. An important improvement in this machine is the Yielding Sectional Pressure Bore or Chip Breakers, consisting of two independent weighted bars hinged to the cylinder frame, and swinging in a direct circle with the cylinder, bringing them very close to the knife. The lift of the bars is unlimited, and, working in combination with the double rolls, adds greatly to the machine's capacity for doing fine work. The bed is raised and lowered by hand or power, and is held upon four large screws, thus having the firmness and durability of a solid bed machine, and securing at once great capacity for changes of thickness without stopping the machine. It is the most convenient, accurate and positive adjustment known. The manufacturers have added quite a number of new machines to their large assortment, which now embraces first-class tools for all kinds of wood-work. Their catalogue will be sent to millmen, operators or others who contemplate purchasing wood-working machinery, by addressing them as above, 3103 Chestnut street, Philadelphia.

Car-Builders' Meeting in Buffalo.

FAULTY CONSTRUCTION AND REPAIRING OF FREIGHT CARS.

At an adjourned meeting of Master Car-Builders held at the Tifft House, in Buffalo, Dec. 12, the following gentlemen were present:

F. M. Wilder, New York, Lake Erie & Western; John Kirby, Lake Shore & Michigan Southern; Leander Garey, New York Central; Robert Miller, Michigan Central; Robert Potts, Canada Southern; A. C. Robson, Lake Shore & Michigan Southern; J. W. Marden, Fitchburg; J. S. Lentz, Lehigh Valley; M. Wilder, New York, Lake Erie & Western; Charles Graham and Robert McKenna, Delaware, Lackawanna & Western; J. D. McIlwain, Grand Trunk; John McKenzie, New York, Chicago & St. Louis; E. H. Bowman and A. Strauss, Pennsylvania & New York Canal & Railway Co., and J. P. Hovey, Rochester & Pittsburgh.

The Chairman, Mr. McWood, of the Grand Trunk Railway, being absent, Mr. F. M. Wilder was appointed chairman.

Mr. Kirby submitted the following question for consideration:

Suppose the roof of a box freight car blows off while in transit, and by examination of the car it is shown that a few nails through the ends of the carlines are all that hold the roof on, should the railroad company in whose possession the car was when the roof blew off be responsible for some contract-shop's faulty construction and replace the roof at their expense, or should the owner of said car take it and be at the expense of replacing the roof?

The reason why I brought this question up is, we quite frequently have the loss of a roof on a foreign road, and if it was decided who was responsible the matter would be settled for all time. I think that the company running the car should not be held responsible for contract shop's poor work, but that the parties owning the car should be, and if the roof is replaced it should be at their expense.

Mr. Marden: If the roof blows off, simply by the force of the wind through no fault of the railroad company running the car, the owner of the car should fix the car or receive it back.

Mr. Garey: There are several matters to be taken into consideration. If a car has been in service seven or eight years, and through rough usage in the train, or because of the wind the roof comes off, the party or road running the car should be responsible, unless they could show that the construction was faulty. I believe that in all cases where it is self-evident that the construction was faulty the owner of the car should be held responsible.

Mr. Marden: The only proper way to get at this matter where no doubt exists as to the faulty construction of the car is to hold the owner responsible for the expense of replacing the roof.

The Chairman: I remember a case where one of our cars with a tin roof got on Mr. Marden's road, the circumstances were such that he did not think they should stand the whole expense, although there were many faults incidental to the roof itself. I finally agreed that Mr. Marden was to repair the car and receive a certain amount for so doing.

Mr. Kirby: The case I had in mind was one of faulty construction, where there were only a few nails in the ends of the carlines.

Mr. Chairman: A case of that kind is one in which I should say the owner of the car should be responsible.

Mr. Garey: That would be my opinion where it is shown conclusively that it was not the fault of the company, and would not have occurred if the roof were properly put on.

The Chairman: In a case where a car was thought to be of faulty construction it is possible that the owners of the car might think it was not, and insist on having the car repaired. I know of some connecting roads that would be apt to say that everything was faulty construction that they could not get off their hands.

Mr. Kirby: There are a great many parties nowadays, who get cars built without any inspector to see that they are built right, they are put into line service and they do not know that they are faulty. In a year the cars give out. Now, it is not right for the parties running that car to be held responsible.

Mr. Miller: I agree with Mr. Kirby, but think that where it is unsafe to run a car with the roof just hanging on, the company running the car should repair it and charge the amount expended to the parties owning the car, if the owners can be found.

Mr. Garey: Regarding the cars owned by trust companies, my practice has been to hold the parties whose initials are on the cars, and so far have found it to work satisfactorily.

Mr. Hovey: In relation to the wind blowing the roofs off of cars, there are a great many circumstances whereby a tin roof can be blown off a car when it is not the fault of its construction; where a car runs into another and strikes a corner of the roof, and the wind getting under raises the roof off.

Mr. Kirby offered the following resolution:

Resolved, That it is the sense of this meeting that roofs lost off cars while in transit, and which, upon examination, show faulty construction; namely, the ends of the carlines improperly fastened to the plates, tin roofs improperly cleeted down, or rotten carlines or plates; the owner of said car or cars shall be at the expense of replacing the roof, and not the railroad company in whose possession the car was when the roof was lost.

The resolution was unanimously agreed to.

Mr. Petrie, having charge of the joint inspectors at Black Rock, being called upon by the Chairman to state some of the difficulties he had to contend with, spoke as follows:

1. Cars requiring general repairs, and which are sent to a home shop, often return without the repairs being done, and in a worse condition, necessitating the company having it in possession to do some repairs before the car is safe to be put in a train for home the second time. 2. Repairs done by the different roads in the joint inspection are often slighted at the repair branches, and also small work done in the train, which causes trouble when the cars arrive at Black Rock, as switching out cars there causes delay which would be avoided if there were facilities to do the work, which there are not. 3. Cars owned by private parties should have a designated shop for general repairs. 4. Cars with weak drawing attachments, such as Pittsburgh & Rochester, Central Railroad of New Jersey, Delaware, Lackawanna & Western, and private companies' cars, with but two ¾ draw timber bolts through the middle sills, should be made stronger. 5. Cars having sheathing damaged are often replaced without being painted, and if painted, numbers and letters are left off; the same is applicable to new doors which have been put on. 6. There is a great deal of wrong material used on all cars, especially in the draw attachments and brakes.

Mr. McKenna: With reference to the draw attachments of the D. L. & W. railroad, I would say for the benefit of Mr. Petrie, we are changing the draw-heads at the rate of about 50 a week.

The class of cars that have been left in line service and are now considered not sufficiently strong, and in many cases with journals too small, and that were being constantly overloaded, was called up for discussion.

Mr. McKenzie: During my connection with a Western road we arranged the matter of cars of this kind by preparing a list of them, which was furnished to every freight agent on the line, and from time to time as we repaired or altered the capacity of those cars, the agent was notified to change his list. I think if we were to issue a list of that kind it would do away with much of that trouble.

Mr. Garey: I quite agree with the gentleman who spoke last as to the advisability of giving the freight agents all the information necessary, and for that very reason. Our agents were instructed to load those cars according to the capacity marked on them. Whether this information will assist us very much in the matter or not I do not know. Some of our cars are away, and we do not see them for a very long time. The sending of cars home when out of condition, that is, not in condition for the service required, is not lived up to, and the sooner the owners realize that the cars must reach home the better it will be for all the parties interested in traffic. Now, if we come together and talk these matters over, and have the inspectors say what their troubles are, and then take hold of it individually and get our officers to help us, which I am inclined to think they will readily do, we can get at the root of this much better.

Mr. Kirby: There are a few of the roads that we have the most trouble with that do not come into our meetings. Now, if we could only get these men to meet here with us, I think we could settle these questions satisfactorily. Regarding this matter of sending cars home for repairs. One of our cars gets started for home; Mr. Garey's inspector, at Buffalo, passes the car, but when it gets to junction point on our line the car will have to be taken by the Lake Erie & Western, and they refuse to take them; we have had as many as 30 of these cars side-tracked. I have had to meet Mr. Cooper and make the best terms I could to get the cars to him.

The Chairman: This matter is with reference to all cars that need repairs, including leaky roofs, etc. We have what we consider a good system; it consists of a board marked, "To be used in local service, not to be loaded with perishable property," which is nailed on the car. These are sometimes line cars; then as soon as we have an opportunity, we repair the cars and take the board off.

Mr. Marden: I would favor a resolution to put signs on all line cars with leaky roofs.

Mr. McIlwain offered the following resolution:

Resolved, That all cars unfit for interchange traffic be marked local, and the capacity be stenciled on said cars; that the superintendents be requested to instruct all agents in the traffic department not to load such cars to points off the line to which they belong, and that all line cars be plainly marked with the capacity, and that the superintendents be requested to instruct agents not to load cars in excess of the capacity marked thereon.

The resolution was adopted.

The Chairman: Regarding cars with leaky roofs, I would say that we have been marking a good many foreign cars, "Bad Roofs, Send Home." I think if we passed a resolution to mark all such cars in this way we would do away with a great many of our leaky roofs.

Mr. Marden: I would prefer to have the sign "Leaky Roof," put on.

Mr. McIlwain: Would this have a tendency to show to every one that the car was not right.

Mr. Miller: I think it would appear a little too plain, but, would like to have Mr. Petrie, the joint inspector at Black Rock, or some party, notify me quietly of the fact.

Mr. Wilder: With regard to marking the roofs "Leaky Roofs, Send Home," I have no fear of it whatever.

After some further discussion by all the members present, the following resolution was offered by Mr. Wilder:

Resolved, That cars in through traffic, which have leaky roofs, be marked with a sign stenciled, "Leaky Roof, Send Home," and that the road responsible for the car be notified of the condition of all such cars. Carried.

Mr. Kirby: I would like to know if there is any one here who knows of a car being in town equipped with the Rote brake.

Mr. Garey: I have a letter from Mr. Hildrup, of the Harrisburg Car Co., introducing Mr. Agnew, the Vice-President of the Rote Brake Co. The gentleman states that his company has a car here, equipped with their brake, and would be pleased to have the gentlemen present witness a test which is to be made this afternoon.

The Secretary then read letter from Mr. Hildrup.

Mr. Wilder: I move that Mr. Garey notify the agent of the Rote brake that the gentlemen present will visit the car immediately after dinner.

The meeting then adjourned until the second Wednesday in February.

Is it Cheaper for a Railroad Company to Buy or Build Its Locomotives?

[Contributed to the Railway Register.]

This is a question that frequently receives no little attention from railroad managers, as they have the arguments of contract shop managers on the one side and those of their master mechanics on the other to determine between. The master mechanic holds that when his men are not employed on repair work he can work them on his new engines in place of discharging them, that for his engines the company is charged no profit—only the actual cost—that his engines are better and more economical in fuel, etc., than contract shop engines. These arguments, together with the cost (?) of the last engine built by the company, frequently carry the day for the master mechanic. It is questionable, however, if the ordinary railroad company's shops can build engines as cheaply as they can buy them, on the same principle that a retail shoe dealer can buy better goods from Eastern factories exclusively devoted to manufacturing than he can make for the same money. No one would think of questioning this, as the manufacturer has invested probably a hundred times the value of the retail store in special machinery in order to produce good shoes, and at prices with which hand labor can not compete.

To be more specific, however, the visitor to a locomotive contract shop will notice the shells of boilers riveted up by a riveting machine, the men doing far better and more rapid work than the gang of hand riveters he would find in a railroad company's shops; special gang drills for boiler work, three-headed slotting machines for locomotive frames, special tools for boring cylinders, special planer for side and main rods, thorough system of templets and special tools and special men and boys for almost every square inch of the engine.

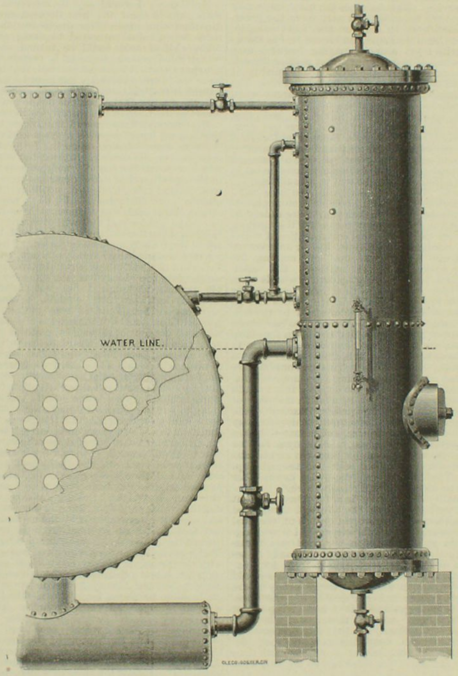
Few railroad companies' shops cost the fourth even of a well equipped contract shop, and until the company's shop has the same facilities as the contract shop it is useless to think of competition, for the contract shop is fitted up with the special view of manufacturing; the railroad shop for repairs. There are a few shops such as those at Altoona, and the Central Pacific shops at Sacramento, which approach in point of special equipment the leading contract shops, but even these will be found to be behind the Baldwin Works. On the point of durability it is often claimed that a railroad company's build of engines are better and longer lived than a contract engine, but when it is remembered that Baldwin, Rogers, Schenectady etc., engines, built from fifteen to twenty years ago, are frequently met with in active service to-day, this injustice assumes a tangible shape. Master mechanics are naturally prejudiced in favor of their own build of engines, which are to an extent like their own children, and their employers are subject to the same feeling. A proper allowance must therefore be made for this. The difficulty, if not impossibility, of determining the cost of an engine built in a railroad company's shop, or while repairs are going on at the same time, is so well known, that knowing ones assert that such cost has never been exactly ascertained. In many shops, if a lathe is running on a piece of work for a new engine, and its services are hurriedly needed for a repair job, the time in changing the latter to the repair job and back again to its orignal work is charged wholly to the repair job, in manifest injustice to the engine receiving it. Comparisons between engines rebuilt and contract shops, engines are frequently made to the latter's discredit, as, for instance, the driving wheels, frames, rocker-arms, etc., of an old engine are used in building a new engine, which engine is charged with these parts for their weight at iron prices, although they enter the new engine as finished material. The master mechanic in such cases will assert that he has as good as built a new engine for two or three thousand dollars less than he could have bought one. But this is all unimportant in comparison with the custom in many shops that build their own engines, of charging the engine with the bare cost of labor and material, neglecting entirely such items as cost of making patterns, which it is argued, as they will never be used again, except in the way of repairs, their cost will be taken care of in such repairing or by new engines built from them, the interest on the capital invested, wear and tear, proportional part of superintendence, clerk hire, insurance, taxes, teaming, shop expenses, such as stationary engine expenses (coal and engineer's pay), heating shops, cleaning shops, gas or other shop-lights, watchman's time, wear and tear of blacksmith-shop tools and machinery, and many other items of like character. And last but not least is the cost of spoiled work, or defective castings, as, for instance, a cylinder may be found to be defective after many hours of work have been put on it.

Many men in a railroad shop are paid by the month, and when holidays or anything occurs for closing the shops, their time and pay go on, and evidently this is a source of expense which, with the cost of trying or testing the engine, should be added, *pro rata*, when necessary, to the items of labor and cost of material which the average road assumes alone to be the cost of the engine.

When one is informed, therefore, that such a road is building its own engines for less money than it can buy them, it can safely be set down that it has assumed the cost of the engine to be the two items of labor and material, and it will be clear from the foregoing that there are many other items of which these new engines should bear their proportional part, for the whole must be paid for by the company, and they are all necessary and ever-occurring expenses of a railroad shop.

It is not to be assumed that our master mechanics are wanting in ability in any way, but rather that they, with their comparatively few tools and repair work, cannot compete with a contract shop, supplied with every facility and with no repair work. Another obstacle in the way is that few roads build engines in sufficient numbers to pay for getting up a thorough templet system, and, as has been demonstrated on sewing machine and revolver work, cheap work cannot be done on the cut-and-try plan—which nine railroad shops in ten use from necessity—in competition with the templet or duplicate system.

In proof of these assertions it will be found that many of our leading and largest roads, and even the Pennsylvania road, with its Altoona, buy all or part of their engines.



A NEW FEED-WATER PURIFIER.

This device for purifying feed water is manufactured by The Stilwell & Bierce Manufacturing Co., of Dayton, Ohio. It consists of a vertical cylindrical shell of wrought iron with cast-iron heads. In this shell are loose horizontal transverse circular partitions, or pans, about two inches deep, each having a hole toward one side, through which the descending water trickles. These pans almost rest on each other, being held off about ⅜ inch apart. The unpurified feed water being fed in at the top, in the center of the upper head, gradually finds its way to the bottom of the shell, below a filtering chamber under the pans. On the bottom is a mud-drum, with suitable hand-hole.

The object of the invention is to supply the boiler with feed water which shall not only be fed in at about the same temperature as that of the steam and water in the boiler itself, thereby lessening the injurious effects of unequal expansion and contraction, always attendant upon the use of cold feed—but to free it from scale producing materials—particularly the sulphates and the magnesium carbonates, which are not deposited at any temperature attainable by the use of exhaust steam as a heater and purifier.

It is sometimes urged against feed heaters and purifiers employing live steam, that they are not economical of fuel. But it must be remembered that there are two ways in which such a feed heater can save fuel—by utilizing waste heat, and by preventing the formation of scale, which is an admirable non-conductor, and causes waste of heat up the chimney, as well as destruction of the plates and rivet heads. You might put impure feed water in at 212°, using the exhaust steam; and if the shell and tubes were already scaled over, and the new hot feed contained sulphates and other impurities not deposited, and was hence constantly adding new scale, the steaming power and the duty of the boiler would be lowered.

We learn that there is one of these new heaters at the paper mill of C. L. Hawes, in Dayton, following a Victor heater of large capacity—which latter was an entire failure, as far as purifying the water was concerned. When the new purifier was attached the boilers were in bad shape, and it soon would have been necessary to remove the flues; but after six months' use with the purifier Mr. Hawes says that the old scale has all disappeared, and his boilers are now all clean.

The Advantages of "Sound" Signals.

A writer in an English railway journal says: "In the matter of signals I consider that the present system is seriously defective in not including the use of sound signals to the extent that is required in practice. A great advantage of sound signals over sight signals is the fact that the former always draw immediate attention, while, in cases of sudden emergency, the sight signal may be presented without being observed, if the men in charge of the approaching train happen not to be on the lookout at the time. At any regular station the sight signal alone is all that is generally necessary, for engine drivers are always on the lookout when approaching one; but it is quite a different thing when a train breaks down on the line, at a distance from any station, and becomes an unexpected obstruction for any other train that is approaching. In such a case it should be evident that a sound signal would be more suitable than any sight signal, for the latter would then be uncertain of being observed, at least in time for action. It is to defective signaling under such circumstances that I attribute the most of preventable accidents on our railways, and a reason very generally given for calamitous collisions is the want of having perceived the stop signal in time to have averted them. Furthermore, in some years hence, when the system of signaling may have attained perfection, I consider it highly probable that the use of signal guns will have been introduced into the railway system just as they are at present employed at sea to such advantage. The signal gun, besides its great power of sound, would admit of being used instantaneously.

January Meeting of the Car-Builders' Club.

CAR WHEELS.

Mr. Leander Garey, the President of the Club, announced the subject for discussion.

Mr. W. W. Snow, of the Ramapo Wheel & Foundry Co., said : This subject has been so often discussed at these meetings that little is left to be said or suggested that will throw more light upon it. A repetition of a few important facts, however, may in time serve to impress upon us the necessity of a change in the system of construction of wheels or conditions of service. Nearly all manufacturers represent that they are making the best quality of wheels, and railroad officials generally insist that nothing but the best shall be used under their equipment. Those conditions carefully carried out, ought to have its influence in bringing about a change in the quality of wheels being placed on the market. In order to insure both the railroad companies and the manufacturers on so vital a point, should there not be some device instituted for testing wheels when manufactured, and before being put into service? This becomes the more important from the fact that the manufacturer may have the greatest amount of confidence in his iron and workmanship, and his customers have the same confidence in his knowledge and integrity ; yet some damaging features may creep into his system of manufacture, that neither himself nor his workmen may observe the difference in quality of wheels made until they show some defects in service. The necessity of testing wheels becomes more apparent when we reflect that railroad companies are now carrying double the weight on wheels than formerly, and that wheel-makers are asked to add only about three per cent. of the former weight to their wheels. Some manufacturers express such unbounded confidence that their productions are amply able to carry this great increase of tonnage, that it is not surprising that railroad officials may be led to believe that this additional weight will be all sufficient for their requirements. Within a few years we have had a boom in cheap chilled iron wheels, and now manufacturers are trying to outdo each other in their sacrificing endeavors to furnish chilled iron wheels below the cost of the medium quality of charcoal pig-iron. The best qualities of wheel irons are to-day costing from $33 to $35, or an average of $34 per ton. This, with cost of making 540 pound wheels, equals $11.34 without the addition of any profit ; and manufactured wheels are being sold $6 per ton lower than the best quality of pig-iron. How much below this figure parties can go and make the best wheel must be determined by the railroad companies using the wheels. We seem to have been reversing the order of things. Had the boom for cheap wheels come first we might have expected a reaction in favor of something better. As it is there seems to be a tendency to go from bad to worse. This can only be prevented by adopting a system of testing a portion, at least, of the wheels made. In order to accomplish this I would suggest the casting on each and every wheel a test piece of proper dimensions, and have the same attached to the wheel when shipped by the manufacturer. This piece may be 1½ inches in diameter, or square, and about 4½ inches long, cast on the plate. Each piece, or as many as may be decided upon for 100 wheels, can be removed and turned up to the desired dimensions, and tested in the most approved manner. These may be cast crosswise, or any other way to get the test piece so it will remain there.

As the best quality of charcoal iron for wheels is that which will chill well and resist the greatest shock, and from the fact that some of the poorest brands of charcoal iron will show remarkable tensile strength, I would suggest for these tests application of a torsional and transverse or crushing strain. A standard could easily be selected from such irons as are well known from long experience to give good results. If railroad companies would adopt this or some similar device we would safely assure them they will get a more uniform quality of wheel, less liable to accidents, damages and delays, and giving longer service ; and although costing more, will be the cheapest in the end. From all the conversation we have had with wheel manufacturers no one depreciates this miserable, poor quality of wheels more than the wheel-maker himself. Yet what can he do, and what is the remedy?

A railroad company places a lot of freight cars on the open market to be contracted to the lowest bidder. The manager places all the safeguards around the specifications that to him seem necessary for his protection. Among other things he demands the three years' guarantee for the service of the wheels. Does this protect him in the quality of the wheels that go under those cars? No. Experience shows quite the contrary. Several car-builders are invited to bid on these cars, and many bid that are not invited. In doing so the builders ask many wheel-makers and brokers for their lowest quotations on 33-inch wheels, without advising that they are for a 20-ton car, or naming any guarantee. The wheel-makers being just as hungry for the wheels as the builders are for the cars, bid perhaps on a 500 pound wheel minus the guarantee. After the contract is awarded it is a simple thing to bring the wheel-maker to the builders' terms. The wheel-maker has too much pride to admit he is not making the best wheel, and therefore guarantees the three years service ; yet he has not pride enough to allow himself to suffer loss in the production, and he looks about for a cheaper mixture of iron. Such is the present state of things, and this will continue until railroad companies adopt some general system for their protection.

Within thirty days we have seen a postal card from a builder lately received by a broker, stating that $7.50 for a 540 pound wheel was too high. He had bought at a lower figure delivered at his works. We have no doubt that the railroad officials purchase cars in blissful ignorance of the fact, and that they have all the safeguards of a three years' guarantee around these contracts. Now if the railroad companies were in a position to send a man to remove some of the test pieces from these wheels and apply a standard test, he would have a safeguard of more value than all the written guarantees that could be made. A guarantee of the present day means only making good the short service of a defective or poor wheel. It does not mean paying the cost consequent upon breaking of the wheel, ditching the train, and delays and accidents to following trains. Mr. Snow then exhibited a number of diagrams illustrating the relative positions which the flanges and treads of wheels bear to the rails, which cannot be intelligently described without drawings.

Mr. Whitney, of Philadelphia, said : I quite agree with what has been said by Mr. Snow, and especially in regard to high prices. There is one point about which I would like to say a word, and that is concerning flat tread wheels. It is a point that I have never heard attention called to except in respect to the practical difficulty of making a perfectly flat tread. In our experience the flange of the wheel is cast downward in order to be more solid, and that part cools first, making in effect a perfectly flat wheel. In one case that I recall we had to make wheels which were required to be flat, and we found we had to make them with a slight cone in order to get a flat tread. We have done the same thing for wheels to run on wooden roads in the South, and in that way the difficulty would be experienced. The chill has got to be with a little cone, the amount of which must be determined by experiment. A very wide tread would produce a different result from a narrow one. The Sayre tread, as it is called, appears to us to be a step toward getting a tread that will meet the difficulty. It depends upon the railroad companies to say whether it is practical. As wheel manufacturers, we are disposed to indorse it.

Mr. Garey : I would say in reference *to* the flat tread wheel, that I think the first decided movement in that direction was made after discussing the subject in this room, when I was requested to make some templets by which chilled molds could be turned, and at that time it was decided to make them of a certain cone in order to get that tread. I have not learned that any chill molds have been turned perfectly flat in order to get a flat tread. I think it has been stated by some wheel manufacturers that the quality of the iron has not so much to do with the wheel as the form of the pattern for the casting.

Mr. Sweet, of Troy, said: I have come to the conclusion that a good wheel depends a great deal on the quality of the iron, a good deal more on the form of the wheel, and more still on the mode of making the wheel. I think the wheel men and the foundry men present will bear me out in the assertion that more depends upon the form of the wheel and the mode of cooling, than upon the quality of the iron. I do not think there is any iron made—any charcoal iron—from which you can make a car wheel that will give any degree of satisfaction, if the form of the wheel should be wrong, or the wheel improperly molded or cooled. I have now in mind a wheel manufactured some years ago, which I think the President of the Club is perfectly familiar with. It is a single plate wheel that weighed some 400 pounds—I think 446 pounds, although I am not positive. It was considerably less than 500 pounds, a single plate wheel, corrugated plate, and it was put on and gave very good satisfaction. But there were objections made to the wheel on account of its weight, and the makers were advised to add iron to the wheel to make it heavier, which they did, and in so doing ruined the wheel. I saw eight of those wheels taken from under a lumber car that had run for eight years. The car was worn out. He had the car in the shop, and called my attention to the wheels, remarking that they were fine wheels yet, and that he was going to put the same set under a new car. Two wheels were made for experimental purposes from the same quality of iron—same form and poured from the same ladle. Mr. Gilbert said that one of those wheels was standing up near their office one day when they heard a loud report, and supposed some one had discharged a gun. They ran out and found a piece of this wheel had jumped right out from the wheel and was broken. The sun had been shining on it and had got it rather warm, and then the weather suddenly changed, and when it came round cold the contraction was so sudden and the strain so great from the tread of the wheel toward the center that a piece jumped out. I think some of the gentlemen present who have had some experience with the Boston & Albany road know something of the contraction and expansion of wheels under certain circumstances. On the Albany & Susquehanna road there is a grade some 30 miles long, down which the trains run without steam. In this running the wheels become very much heated and then contract, causing more or less wheel breaking at the bottom of the grade from the heating of the treads of the wheels. Unless the plate is of a certain form, so as to conform to that expansion and contraction, the wheel will pull itself in two. One wheel, the plate of which, upon examination, was found to be broken, and the crack was so large that a rule could nearly be put through it. An hour or two afterward it was hard work to determine which was the broken one. The crack had closed up, leaving scarcely a trace of the fracture. So I say that good wheels depend upon the quality of the iron, upon the form of the wheel, and still more upon the manner of making. This is my experience.

Mr. Whitney : What is meant by the manner of making?

Mr. Sweet : The mode of cooling the wheel. If a wheel has a strain on it when it comes from the works it is never a safe wheel. The very fact of a bracket being on a wheel when it leaves the foundry is an indication that the wheel is not a safe one. When we come to talk about making tests of iron pieces to indicate what a car wheel will do I think we had better apply the test directly to the wheel. For instance, we put a wheel on its edge, if you please, and we strike it a certain blow. We will have some method to indicate that the blow we give it is something like the concussion it has to stand when in service. We take our wheels and we bed a piece of iron in the ground on which to place them, and with a 32-pound sledge we strike the wheel. Sometimes we take one or two men and pound the wheel. If it breaks under 60 or 70 blows we consider it an unsafe wheel. We strike a wheel sometimes 700 or 800 blows and the wheel does not break, and then again a wheel will break at 16 blows. That would be an unsafe wheel to put under a car. But to refer again to expansion and contraction. I believe there is no iron made that can stand an unequal contraction and expansion. The contraction is what pulls the iron in two.

Mr. Whitney : Do I understand you to say that you strike on the tread of the wheel?

Mr. Sweet : Yes, sir ; on the tread of the wheel, and if there is any strain it will break the wheel.

Mr. Whitney : I should like to know if there is any wheel that will stand the heating and expansion on these steep grades. Of course I am aware that some forms will will stand better than others. I think that the wheels not being annealed, and no provision made of any kind to take off the inherent strain from casting, is sufficient evidence that it will also break even after it has been annealed, if the conditions are the same as those in which it breaks in the first place. The remedy appears to be not to use the brakes so hard. In reference to testing, I would like to say a word. I think the subject was discussed at the meeting of the Association held at Buffalo last spring. I was in hopes something would come out of it in the nature of a test such as is used for axles. I suppose most manufacturers test their wheels wheel by wheel. I know *we* do. If we find a crack in the wheel or check on the bracket the wheel is thrown out at once. On one occasion we had a form of pattern that was very apt to crack; there was a little rib, and the iron would run hard there and it would crack. We changed the form of the pattern so that all the parts would be alike, and the same iron would not crack. It is undoubtedly true that the form of the wheel has a great deal to do with it. After the meeting at Buffalo, I sent a paper to the *Railroad Gazette*, and I see no reason to change the opinions I advanced then. I think every railroad company has the means of determining what wheels will stand. Suppose they demand of every maker that he shall send sample pieces which they can test, and also sample pieces of the chill. The metal may be all right, but then the form has got to be taken into consideration also. You must have a wheel made of such metal as is satisfactory. Apply any test you please, only apply the same test to all wheels. Then, if several wheels made of precisely the same iron, as shown by the tensile and transverse test, one would break much easier than the others, simply from the fact that the pattern was defective. I think in such cases the railroad company could use a test that would suit. It would be a great deal better than a guarantee of a term of years or mileage guarantee. In regard to these tests, I do not think that, as Mr. Snow suggests, the best plan is to take a piece cast from the wheel. It is difficult to get the right sort of a piece, and as for any guarantee that the sample piece sent belongs to the wheel, you have got to accept the statement of the wheel-maker that the piece does belong to it.

Mr. Sweet : I would say in relation to the forms of a wheel that we made two wheels of different patterns and cast them both from the same ladle. We took one of the wheels and stood it on the tread and put a piece of pig-iron in the hub, resting it on an angle of perhaps 40 or 45 degrees, so that it would stand. One of the wheels was broken from one side of the tread around the hub to the other side, and the other wheel stood 70 blows of the sledge on the tread before it showed any fracture, and then only cracked the brackets. This test was made from the same ladle of iron, both wheels poured at the same time and treated in the same manner. One wheel (double plate) pulled itself in two, while the other stood 70 blows with a sledge. We had another single and double plate to test, and the single plate stood 32 blows with the sledge and the other pattern broke itself.

Mr. Garey said that some time ago he had obtained from a number of wheel makers samples of iron used by them in the making of wheels, and had tested the samples by Professor Thurston's machine. He had also tested sundry pieces taken from worn out wheels, and exhibited diagrams illustrating the various tests. One of the pieces stood a tensile strain of 50,000 lbs. to the square inch section.

Mr. Chamberlain, of the Providence & Worcester road said : I would like to ask what has been learned from the samples that have been treated on the machine? We have got good iron, but we do not know the mileage of the wheels. We do not know the wheel makers. It seems to me that if there was some principle that could be devised by which we could take a test of a certain wheel product, and know its mileage, and could have it analyzed and could produce a duplicate, we should be making a step in the right direction. I am not aware that this can be done. I would like to ask some of the wheel makers if they can analyze the iron and produce a duplicate mixture.

Mr. Sweet : I was not aware that cast iron would stand tensile strain like that referred to by Mr. Garey.

Mr. Garey : I would say that the object of the members of the Car-Builders' Association is to help manufacturers to produce the best wheels that can be made. These meetings are for the purpose of assisting one another, and it would be very satisfactory to me, and probably to all present, if there were more gentlemen who would talk on this subject. I am very well satisfied that a great many of them have a great deal to say if we could only get them to say it. They probably have some ideas that might be of benefit to us all. It is not manufacturers, or owners of railroad stock merely who are interested in this subject, but every man, woman and child in the country. They all travel, although they know very little about car wheels. If a wheel breaks and kills a few people they begin to take an interest in the subject at once. I must say it is very flattering to the wheel manufacturers that there are so many wheels in service and so few that are reported broken where any damage is done or lives lost; at the same time, there are a great many wheels that *do* break, very many more than I think we ought to have broken. If the wheels would only wear out and not break, so we could discover when it is necessary to remove them before there is any liability to accident, it would be more satisfactory to most of us.

Mr. Forney: From all we can hear, there seems to be no process by which cast-iron wheels can be made of a certain quality. To get a good wheel appears to be altogether a matter of chance. Mr. Forney then read some statistics, comparing the record of railway accidents, as made up by the British Board of Trade, with the record of such accidents in this country, as published in the *Railroad Gazette*. During the five years previous to 1883, there were 5,337 accidents reported in the *Gazette*, of which 3,545, or over 66 per cent., were derailments; while during the same period, 5,191 accidents were reported to the British Board of Trade, of which only 410 were derailments. In England the reports are made by government authority, and the roads are compelled to give correct information; while, probably, not more than one-third of the accidents that actually occur in the United States are reported in the *Gazette*. Mr. Forney, continuing, said: In the first place there is no common system for gauging the rails, frogs, switches, and the other portions of the permanent way. Mr. Snow has shown the difference which results simply from the form of rails and wheels. Few car-builders realize that the form of the rail-head curve on the corner of the rail will make so much difference in the amount of the play of the wheel. The corner of the rail-head will vary from about ⅜ up to ⅝ of an inch, which is the curvature used on the Lehigh Valley road. If you will take a wheel with ⅜ radius in the corner, and apply it to a rail with ¼ radius, the gauge would be very different from what it would be if you take a wheel with ½-inch radius and apply it to a wheel with a ⅜ radius. Besides that, the flanges vary according to the makes of the wheel. In short, the whole system is a most disgraceful one over the whole country. It certainly is unworthy of the car-builder and all railroad men, and the sooner attention is given to it the better. I presume that the great demand for wheels with steel tires has led nearly every wheel maker to devise some means for fastening on the tires. If this was an entirely new question it would be a very good reason for our devoting our ingenuity to the solution of the problem and endeavoring to improve the steel-tired wheel. Instead of this, it is an old question, there being records of accidents from the breakage of steel-tired wheels as far back as 1848.

Mr. Sweet: It seems that we have reached a time when almost all the railroad men, and the wheel makers themselves, are looking for something better than they have heretofore had. The question now comes up for consideration as to the wheel of the future. If there is a better wheel than the cast-iron wheel, we, as manufacturers are ready to make them. Now, I do not know, but I understand that it was reported at the Niagara meeting that a paper wheel had never been broken. I do not know that gentlemen all corroborate that statement. I think, however, that some paper wheels have been found broken in railroad yards.

Mr. Forney: I would say by way of explanation, that I do not wish to be understood as being opposed to cast-iron wheels.

Mr. Whitney: I want to state that I believe when Mr. Forney started out, he had loaded his gun for steel tires, because he had been shooting at the cast-iron wheel men about a year ago, and they got pretty tired of it. I think he published some articles, which, though not designed to give the impression, were to the effect that about five per cent. of the cast-iron wheels of this country break every year. Attention was called to the subject by Mr. Francis Galton, in an address read in London before the Civil Engineers. The cast-iron wheel did not break all to pieces when it did break. A carefully tested wheel could be discovered and taken out, but when a tire breaks it goes all to pieces. Every thing depends on fastening the tire to the wheel so it cannot get away.

Mr. Snow: Mr. Taylor, of England, when he was in this country, made a very careful inspection of our railroad system, and on his return to England he issued his report, and in it he recommended to the English people the use of the American chilled iron wheel. He believed it to be the best and safest wheel.

Mr. Garey: You must bear in mind that the wheels reported broken are not wheels from which pieces actually come out, but any wheel that is cracked is reported by the inspectors as a broken wheel, and removed for that cause. I am inclined to think we remove monthly on our road, from our own and foreign cars, somewhere not far from 100 wheels that are reported broken, and it is very seldom, indeed, that we have an accident that is caused by a broken wheel. It is a very difficult matter to determine whether, in case of accident, the wheels are broken before or after derailment. What we should strive to do is to make, if possible, a better cast-iron chilled wheel. Unquestionably there will be a large number of them used for years to come, and it will be long before they will all be removed from under cars running on passenger trains. Railroad managers should hold out inducements to the manufacturer to make a better and a safer wheel, if possible, either in the form of the pattern, the quality of the iron, grade of manufacture, or in some, or any, or all ways to give us more safety in that part of our cars most liable to cause accidents. These meetings are for the purpose of helping to attain this end—more safety, a better quality, and the price as low as we can get it.

Mr. Snow: That appears to be the principal feature now—"the price as low as we can get it."

The President intimated that he would like to hear from the steel-tire, wrought-iron-center, and paper-wheel men.

Mr. A. G. Darwin, of the Allen Paper Wheel Co.: It was not my intention to give you any information here to-night. I am not an expert. I came to hear what you had to say. It is from you that we learn how to make wheels. I am very glad to be able to give our iron-wheel friends a little comfort. We have known instances of paper wheels breaking. We purchase our tire from the best makers that we know of, and they assume to give us the best tire they make. Sometimes they do not give it to us and they break; but I can say that we have made 40,000 paper wheels. I have not heard during the last year of a single breakage to the injury of a car or passenger. I have been much interested in what I have heard here to night, and think we can all derive benefit from the knowledge imparted by gentlemen who have had so much experience in this wheel business. I am specially pleased to learn that my friend, Mr. Snow, has copied the paper wheel in every particular, so far as he can without infringement. That is pretty conclusive evidence that he believes in paper wheels, and I think that you are all going to believe in them in time; but I do not think I can tell you anything about them. We are trying to improve upon it, and other gentlemen are bringing forward steel tired wheels, and in time, if the railway companies are convinced that it is best to equip their trains with them, we shall probably get our share of the business. We do not think that we have a perfect wheel; we think that we can improve upon it, and we want to do so.

Mr. Snow: I indorse all Mr. Darwin says about the paper wheel. But I believe chilled iron wheels are the safest and cheapest if made of the best known irons. I built 190,000 of them before I heard of a single one of them breaking to do a dollar's worth of damage.

Mr. Forney: Will the proportion of breakages of cast-iron wheels, made of the best known irons, be as small as with the best steel-tired wheels?

Mr. Snow: Yes, sir: as small or smaller.

Mr. Forney: It is difficult at the present time to find any public record of the breakages of wheels that is worthy of the name. Railroad companies do not like to admit that an accident is caused by the breakage of a wheel, which might make them liable for damages, so that if you do not have an accident investigated by some one outside of the company you are not very likely to get the true inwardness of it.

Mr. Darwin: There is one matter which is now attracting considerable interest among our patrons, and I would like to hear the experience of gentlemen on that question. That is with reference to the tread or coning of a wheel. We have a certain standard to which we make our wheels, but it is not entirely satisfactory, and we also find that our patrons are a little uncertain themselves as to what they want, and our only opportunity for getting that information is at such a meeting as this.

Mr. Blackall, of the Delaware & Hudson Canal Co., suggested that as this question was to be determined by letter-ballot its discussion at this time might not be expedient. Referring to the diagrams exhibited, he wanted to know if wheels with a low tensile strain made as good service as the ones with 50,000 pounds strain.

Mr. L. Garey: I would say that the low strains are from chilled iron, while the higher ones are from grey iron. This is the one which indicates the 50,000 pounds, and the testing of that piece astonished every one who witnessed it. That iron is from parties from whom we expect extraordinarily strong iron. In fact, all of these pieces are from parties who are supposed to use a superior quality of iron, and, so far as I know, all these parties make good wheels. It is unfortunate that Prof. Thurston is not here. Possibly there may be some exceptions to his figures, but certainly I have no reason to doubt their correctness.

Mr. Sweet: I would like to say a word in relation to the tensile strength of iron that has come under my notice within the past three months. A certain iron founder came to our place and sold us two car loads of iron, and warranted it to stand 40,000 pounds tenacity, or something like that. On this recommendation we took the iron, and when it came we were astonished that any founder should send it to a wheel-maker. I told him we could not use it for wheels. It was very close grained and very compact, and I judge was made from this new iron that these men up the river are making. I was shown a number of letters certifying that it had an unusual amount of tensile strength, but it was entirely unadapted to the manufacture of car wheels. It would not have been safe at all. We have got to keep all the conditions in view and get an iron of reasonable tenacity. We can not get too open an iron. If we get it with too much carbon we can not get a chilly iron. On the other hand, if we go to an extreme and get a close-grained iron, then the wheel suffers from other conditions. The iron is not ductile enough; hence we must not be governed by an iron, or infer that the iron that stands the greatest possible amount of tensile strain is the best iron for a car wheel.

Mr. L. Garey: My object has been to arrive at that quality of iron which is best for wheels. If we could once establish that quality we would ask the manufacturers to use it. But the quality must first be established.

Mr. Snow: I understand you have some test pieces that have been taken from wheels that have been in service. So far as it goes it is a good thing to do; but by selecting wheels that have been very long in service, and testing the pieces, some standard might be arrived at, either in tensile or torsional strength or ductility, or qualities that are in the iron might be discovered; and for that purpose it would seem to me that the Car-Builders' Association, or the railroad companies through the Association, should make such tests. Wheel-makers cannot be expected to do it. The railroad companies should do it and then make a standard by which the wheel-makers are to be governed in the kind of iron, quality used, etc. Then comes the price. If we can produce satisfactory wheels by using cheap iron I certainly would like to know it, and the railroads ought to know it.

Mr. F. D. Adams, of the Boston & Albany road: I see you are about to adjourn, and as I came away down here to listen to the discussion of this wheel question, I would say that I have obtained some very good ideas and some very confused ones. It is an old saying that where doctors disagree the patient suffers, and I think it is about the same with the wheel problem. There are one or two things that have interested me considerably in this discussion. I have been a little astonished to see that our worthy President (Mr. Garey), with all his experience and far-sightedness, favors iron wheels under passenger cars. There has got to be a time when this thing must be met square in the face. Passenger cars will have steel-tired wheels, everything to the contrary notwithstanding. It comes of its own natural force, and the best thing for the iron wheel men to do is not to offer any opposition to it. There will be a time when no passenger cars will run in this country without steel-tired wheels. I remember the time very well when Mr. Chamberlain and myself were about the only ones that stood up in this room and advocated these wheels, and we were looked upon with a little bit of distrust because we did so. Some thought we were rather shattered, or that a little something was the matter with our brains; that we had got a little one sided on the question. Mr. Forney, too, was a little inclined to poke fun at us, but I see that he has come to his senses. I am glad to get such an advocate, because he brings his statistics right along. We did not have statistics. We had to wait for them. We have run steel-tired wheels on the road with which I am connected, for 14 years, and we have not a single part of our passenger equipment with an iron wheel upon it. We use steel-tired wheels because we believe they are safer, and to back that up I can say beyond all possible question, that we have not had an accident, to my knowledge—and I think it would have come to my knowledge if we had had one—where any damage resulted by the breaking of a steel-tired wheel in all these 14 years. I do not say that we have not had them break, but I do say that no damage has resulted in 14 years. Mr. Whitney, I believe it was, conveyed the idea that when a steel-tired wheel broke it broke all to pieces, and that iron wheels did not. I think it is exactly the other way, and I speak from an experience of 14 years. There is not a steel tired wheel that lets go before it breaks without showing some signs of it. I am not here to advocate any special kind of steel-tired wheel, because we have various kinds on our lines. From no one of them have we ever had an accident that has caused any material damage from the breaking of the wheel, and we have wheels on the road that have run over 500,000 miles, and a large number have run over 300,000 or 400,000 miles, and we can show some statistics that would be interesting. I advocate a steel-tired wheel of some kind, and I think we can show, when we have the time to make the mileage, a very large mileage in favor of steel wheels, and a large percentage of saving over iron wheels. We have the data for nine years of some fifteen makes of iron wheels. The mileage that they averaged was on the Boston & Albany road. If they made a smaller average of mileage on that road, the steel wheels would make the same proportional mileage, so we think it is fair to take the data of the mileage that iron wheels made under our coaches, to compare with the mileage that the steel wheels made under them. We do not claim that iron wheels make as great a mileage; or rather, we claim that they do not make as great a mileage on the Boston & Albany road as other people claim they make on other roads.

Mr. Marden: The flanges of steel tires must not be allowed to get cut, or it will be impossible to turn them but once; in endeavoring to get a flange, the tire will be turned nearly completely off. The only way to make a steel-tired wheel economical is to watch it well and take it out immediately when it needs turning, or else, if one flange is worn sharp, turn the axle round or prevent it in some way.

Mr. Snow: I suppose the Pullman Palace Car Co. have probably the best mileage system in this country. I know in the Northern division that the cast-iron wheel has made over 50,000 miles on the average, and in the Southern divisions over 60,000; and as to the correctness of that record, I do not think there is a road in this country that has a record that compares with it.

Mr. W. E. Chamberlain: I suppose that all the members are aware that it makes a great deal of difference in the manipulation of the tire with the same amount of carbon. You may have the same amount of carbon in steel-tired wheels, but you will not get the same result from each. Why? Because you have hard and soft carbon. The steel wheel-makers analyze the ingot, and they mark it whatever it may be; but in the manipulation of that tire it is either harder or softer, and the only man that can tell the difference is the man who turns them. If you have a man of keen perception, you can get two wheels that will wear alike.

Experimental Work on Metals.

Prof. Thomas Egleston, of Columbia College, has addressed the following letter to us in regard to a series of experiments which he proposes to make on the properties of metals and alloys of all kinds. The professor has for many years been making preparations for exhaustive experiments on alloys, and it seems probable that some good results will be obtained from his researches. Those desiring to send specimens cannot do better than to correspond with him and obtain further particulars in regard to to the subject.

New York, Nov. 16, 1883.

Dear Sir: For some years past I have been making investigations on metals and alloys, and have arrived at a point where I am very anxious to secure specimens in order to investigate the effects of compression. Will you be good enough to announce the fact through your journal, and ask the manufacturers of metals and alloys of all kinds to send me specimens for that purpose?

For such specimens I should like of each metal sent—first, three pieces two inches in diameter and three inches long; second, two pieces one inch in diameter and four inches long; and third, about three pounds of clean filings, for each examination. As I desire to make at least three examinations of each metal sent, I shall need fifteen pieces in all (nine of the larger size, six of the smaller, and nine pounds of filings).

As these investigations on the effect of compression are made at very great cost, and as I am making them for scientific purposes only, without remuneration of any kind, in the hope of discovering some facts which will be useful to manufacturers, I shall be very glad to make besides, comparative tests other than compression, and also analyses of the metals and alloys for their actual cost to me, making no charge for my own time or services.

The results I have already obtained are such as lead me to believe that the results of the investigations I am about to make will be of great interest to all persons using metals of any kind for construction.

A few very liberal gentlemen and firms have supplied me with the amount necessary for the investigations on compression, but I have no funds with which to make the comparative tests on tension and on torsional and transverse strain, and I am therefore willing to make them for their actual cost to me, and request your kind interest in making my purpose known to your readers and asking their assistance. Thomas Egleston, Professor of Metallurgy,
Columbia College, New York City.

A Car-Tracing Incident.

The following experience of a car-tracer is related by a St. Louis paper:

"Some people think I have a soft job, but they are not familiar with my duties. I have been car-tracing a long time, and am compelled to say that some of the cars I was sent out to find nearly a year ago are still missing. The other day I struck a junction on one of the railroads running through Illinois, when I happened to see a strange-looking object near the track that looked like a sort of canal boat with windows in it. Smoke curling from a stovepipe that protruded through the roof of the concern convinced me it was occupied. Out of curiosity I walked up to the concern in order to get a better view of it. On close examination I found it contained letters and a number on its side. Refering to my book I discovered it was the identical car I had been trying to find for six months. The railroad company had established a station there, it appears, without building a station-house for the accommodation of the public. Determined to supply the deficiency, the residents of the neighborhood had confiscated the car, placed it in a conspicuous place near the track, cut holes in it for windows and converted it into a depot. I reported my discovery, and shortly afterward the company hauled the car away, disregarding the protests of the residents against the proceeding. Sometimes we find the remains of demolished cars at the foot of some high embankment, sometimes cars with their roofs sticking above the surface of some pond, and sometimes we never find them at all."

There is a town in Texas where business is so dull that when the boy who goes out on Saturday to collect bills for a leading dry-goods establishment, and comes home with seventy-five cents, and has the ceiling of his pants worn out by the boots of the customers from whom he has collected it, the proprietor regards it as a good day for collections.

Passenger Car Roof Construction.

THE method of passenger car roof erection in the shops of the Boston & Albany road is a somewhat novel one. Its peculiarity consists in erecting and nearly completing the roof directly upon the floor of the car, and then lifting it by means of tackles to its proper position and setting up the posts under it.

The engravings represent the roof in two stages of construction. Fig. 1 shows the iron carlines in position, with two of the pairs of carlines that are put on each side of the raised deck windows. Fig. 2 shows all the carlines in position, as well as some of the details of the work. The roof plates do not rest upon the floor of the car, but upon short posts 5 inches long in the clear, that fit into the mortices of both plate and sill. To these posts the plate is held by carpenter's clamp-screws. This is shown in each of the cuts. The end-plate of the roof is held in place by two stout timbers bolted to the end sill. The platform plate and platform end carline are connected by a corner casting in the usual way. A chain, with a stick for a turn-buckle, enables pressure to be brought to bear when putting the framing together. The method in which the chain is rigged is shown in Fig. 2. It will be noticed that the car is set up on blocks, and is not built on trucks, as is the custom in many shops.

After the side and end plates with the platform hood framing are set and secured, the iron carlines are put in place and screwed down with screws which go through "feet" welded on to each end. The places for all the carlines being scribed on the plate, they are set up and tacked in position with light strips and fastened by wood screws through the feet. The common carlines, except that portion which crosses the raised deck, are of two thicknesses, glued together. This part is a single stick of selected ash. The made, or double part of the carline, consists of two strips of ash ½ an inch thick and two inches wide. At the angle between the side of the deck and the lower part of the roof a third piece is put on with its grain running nearly at right angles to the pieces beneath. Two of the sticks stop short of the corner to allow this piece to be put in. All the end joints are tongued and grooved and well glued. Thus made, the bend of the carline, which it will be seen is quite sharp, is made very nearly if not quite as strong as any other part. The whole carline is composed of eleven pieces. The central portion, which is of a single stick, is so shaped that the 2-inch depth at the ends is continued all the way across without breaking the grain or cutting into it. The crown of the roof is obtained by the addition of a curved portion to the top of what would otherwise be a straight carline. The curve of the head-lining is formed by deepening the stick at the ends, as shown in Fig. 2. The carline, thus constructed, has a stiffness that is almost surprising to those who are not familiar with the putting together of wood in this way.

When the carlines are all in place, and the light bracing tacked on to hold them, the roof is ready for the next step, which consists in putting in the blocking or furring. Of this there are four lines on each side. Two lines are used to form the top and bottom finish of the raised roof window-casing, while there are two other lines, one of which is placed at the bottom of the carline near the plate, and the other at the top of the raised roof side. This furring is all got out in advance by machinery, and is ready to go into place without fitting. It is of ¾ white-wood, and is put in place with glue, after which it is carefully tacked fast. When the carlines are being glued up stops are glued upon them to receive the lines of blocking. These stops are held by a couple of nails and the glue. As they are put on by means of gauges, and as every carline is an exact duplicate of every other, the work of putting up the roof progresses with great rapidity. The stops for the blocking are shown in the cuts. When the carlines are in position all the blocking is laid in place before any of it is glued or nailed. This is done to prevent the carlines from being bent or displaced by driving the blocking home.

The framing of the roof is done very expeditiously, the men working together in pairs when putting in the furring, the gluing and nailing being done about as fast as the work can be described. The strength of a frame built up in this way is apparently quite out of proportion to the size of the parts, and even before the roof boards are in place shows remarkable stiffness. Before the roof is lifted to its place the raised deck is boarded and the molding around the edge finished, the openings for the clear-story windows and ventilators completed and the platform hood finished. The flashings are put on around the end of the hood along the sides of the deck, and two or three lines of roof boards put on the lower deck, as well as one row of tin plate. Except the tin and two rows of roof boards at the eaves, the whole roof is finished. In fact, it could be finished before lifting to place if it was not necessary to make connectious with the plate which has to be uncovered for the purpose.

In lifting the roof, a very neat problem is presented in finding the points of attachment for the ropes so that the camber of the roof shall remain unaltered. To do this the weight of each part of the roof is found, and the distance of its center of gravity from the center of the roof computed. By this means the centers of gravity of the two halves of the roof are found, and are the proper points for the attachment of the lifting ropes. The problem may also be solved in another way which seems to give good results and does not require much calculation. This plan makes use of three ropes, and uses the center one to preserve the camber and assist in steadying the roof as it is lowered upon the posts.

After being raised into position, the roof is lowered at one end till it takes a bearing on the end posts, when the window posts are put in place as the roof is lowered further, and entered in their mortises successively.

The advantages of having the work near the floor where the men have their tools and benches within easy reach, and are saved the trouble and delay of climbing up ladders and working on unsteady lengths of plank, are very considerable. Where proper preparation can be made for it, the plan is one which is well worth trying, as it seems to be very much superior to permanent staging even in point of convenience.

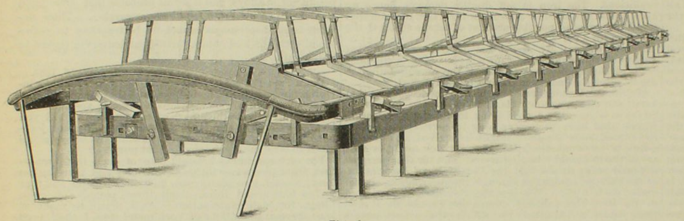


Fig. 1.

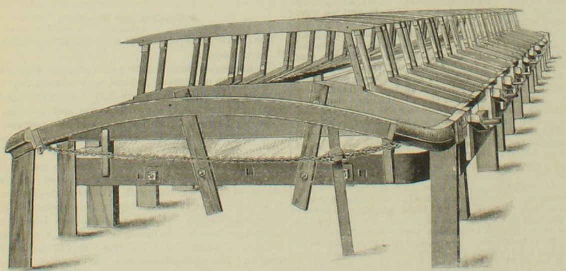


Fig. 2.

Railway Construction in 1883.

Notwithstanding the fears expressed that new construction was being confined to such narrow limits in 1883 that coal, iron, rail making, and many branches of railway manufactures were suffering seriously from this cause alone, it is now evident that considerably more than six thousand miles of new main line were completed during last year. Judged by any other standard than that furnished by the extraordinary development of 1881 and 1882, and especially the latter year, the mileage completed in 1883 would seem to possess large proportions, and it materially exceeds the new mileage of any year previous to 1880, except 1871. During the five years extending from 1874 to 1878, inclusive, the total amount of new mileage was 11,497, or at about the rate of 2,300 miles per annum, while in 1882 the increase of mileage was 11,591, or more than in the entire five years extending from 1874 to 1878, inclusive, and last year the new mileage was about equal to that of the three years extending from 1874 to 1876, inclusive. The incoming year is likely to witness a more notable shrinkage in the amount of new construction, and it is mainly on account of the marked diminution from 11,591 miles in 1882 to about 6,500 miles in 1883, with a still further prospective decline in 1884, that there is a comparative dearth of employment for the productive capacities adapted to the urgent wants of new construction at the rate of nearly a thousand miles of new railway per month.

The most extensive addition to previous mileage made in any one quarter in 1883 was that perfected by the Northern Pacific system. Other long additions, however, were made in connection with the extensions of the Atlantic and Pacific, the completion of the New York, West Shore & Buffalo, and the improvement of southern systems. A large amount of the new construction was intended mainly for local development, consisting of comparatively short lines which will form branches or extensions of pre-existing systems. As compared with 1882 there is not only a great diminution in the aggregate amount of new construction, but in the additions to mileage in nearly every State and Territory. The most notable exceptions to this rule are the increase of new mileage in Alabama from 50 in 1882 to 181 in 1883; in Idaho from 216 in 1882 to 282 in 1883; in Kentucky from 73 in 1882 to 124 in 1883; in Louisiana from 95 in 1882 to 240 in 1883; in Michigan from 328 in 1882 to 405 in 1883; in Mississippi from 120 in 1882 to 305 in 1883; in Washington Territory from no new additions to mileage in 1882 to 146 miles in 1883. The localities in which there was an exceptional increase of activity were confined mainly to the extreme Northwest and a few of the Southern States bordering on or adjacent to the Gulf.

Some of the most notable diminutions in the amount of new mileage were in New York, where there was a decrease from 705 miles in 1882 to 375 miles in 1883; in Pennsylvania from 526 in 1882 to 339 in 1883; in Georgia from 334 miles in 1882 to 64 miles in 1883; in Tennessee from 165 miles in 1882 to 41 miles in 1883; in Ohio from 610 miles in 1882 to 326 miles in 1883; in Indiana from 611 miles in 1882 to 178 miles in 1883; in Illinois from 443 miles in 1882 to 154 miles in 1883; in Wisconsin from 353 miles in 1882 to 191 miles in 1883; in Minnesota from 397 miles in 1882 to 182 miles in 1883; in Iowa from 803 miles in 1882 to 218 miles in 1883; in Missouri from 293 miles in 1882 to 116 miles in 1883; in Arkansas from 499 miles in 1882 to 121 miles in 1883; in Texas from 1,080 miles in 1882 to 68 miles in 1883; in Colorado from 579 miles in 1882 to 64 miles in 1883; in California from 328 miles in 1882 to 223 miles in 1883.

The tendency toward greatly reducing the amount of new constraction in the young States and territories will probably be even more marked in 1884 than it was in 1883. Nearly all the important projects in the Northwest, Southwest, the Territories, and all regions west of the Missisippi, have been substantially completed, and it will require a considerable increase in the present amount of traffic to keep the immense additions to the mileage of the trans-Mississippi regions as fully and profitably employed as is desirable. The decline in the securities of a number of the most important of these lines which has occurred during the last year will probably serve as a powerful check against large outlays in similar enterprises for some time to come. Analogous views may appropriately be expressed in regard to nearly all other sections, and the country will probably pass through an era of shrinkage in the amount of annual additions to mileage like that which occurred during the period of five years which followed the panic of 1873. It is noticeable, however, that a few of the older States, and especially portions of Pennsylvania and Maryland, seem to be probable theatres of new construction on a somewhat imposing scale.—*Railway World.*

THE Union Switch & Signal Company have received the highest premium offered for signal appliances by the National Exposition of Railway Appliances in Chicago for 1883, being five medals, two gold and three silver, as follows: Gold medal for best system of interlocking yard switches; gold medal for best electric signaling device for block or other signals; silver medal for best signal for railway crossings; silver medal for best depot signal; silver medal for best semaphore.

Double Iron Transom for Passenger Cars.

The engravings represent a double iron transom which is in use on the passenger cars of the Boston & Albany Railroad. One of the valuable features of the construction is, that with the exception of the washers on the under side, only merchant shapes of iron are used. This reduces the blacksmith work to a minimum. The transom is made of bar iron and I-beams held together by bolts passing through gas-pipe ferrules, and which are filled with wood. There are four pieces of flat bar iron 1×6 in., and four I-beams, two aboat 6 in. and two about 9 in. in depth, and ½ in. thick, merchant sizes being used and adapted to the plan decided upon.

The top piece of the frame is straight, and has lugs welded up on the ends to take the thrust of the lower bars. These lugs are made 1 inch thick by 3 inches long, to prevent them from being sheared off by the thrust. The upper bars, after the lugs are welded on, are taken to the machine shop, where the holes are drilled and the seats for the lower bars planed out. The lower ones are punched, drilled to templet, and cut to the proper length in the planer. The I-beams are made in a similar way. The center ones which form the bridge to carry the center-plate, have lugs welded upon them to form stops for holding the transoms. These lugs are put on both the upper and lower sides at both ends. The beams are then placed in the planer and the seats for both the upper and lower plates of the transoms planed out. The smaller I-beams are treated in the same way. The lugs, or stops, are shown in Fig. 1, in which the transom is represented in its proper position. The smaller beams have lugs only on the top, as they are made considerably deeper than the transom at the point where they are inserted, which brings the lower transom bar through the web, as shown. These beams are brought down low enough to enable the steel plate side-bearing to be riveted on to their under sides, as shown in Fig. 2. The center-plate is held upon the central beams by four bolts, and the wedge-shaped washers on the under side of the transom bars are also shown in Fig. 2. These give the nuts a square bearing surface.

There are six bolts on a side, passing through thimbles of gas pipe. These thimbles are, we believe, filled with wood. The bolts through the flanges of the beams, of course, do not require them. They are made in pairs, the ends of each pair being cut off square. The required angle is obtained in cutting them apart. The holes are all of them drilled through templets both in the beams and plates, and the work is as far as possible arranged in such a way that jigs and patterns can be used and the parts finished several at a time. The great width of the bolster, combined with its unusual strength, gives the end of the car a very admirable support, stiffening it materially. So far as we are aware this form of transom has never been employed on any other road, although double transoms are used by many builders. The use of the I-beam considerably simplifies the construction of the side-bearings and obviates all necessity for connecting the parts of the transom by trusses. Whether the labor in fitting it is less than in fitting up a truss we do not know from actual figures, but apparently it is considerably less.

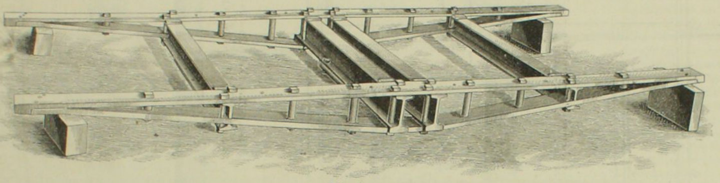


Fig. 1.

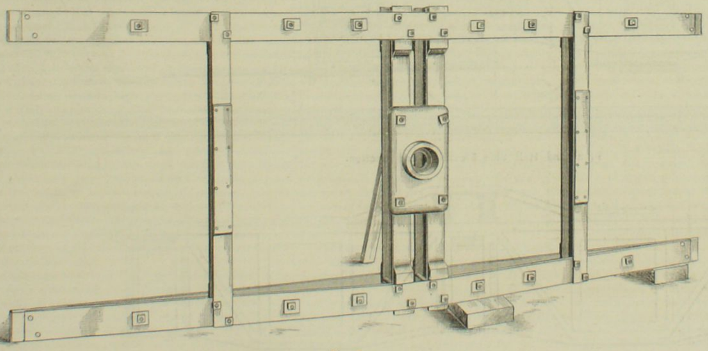


Fig. 2.

Prevention of Railway Collisions.

Leon Sirieix, of San Francisco, has just completed a working model of an invention by which collisions on railways may be prevented. It is an electric system, the electricity being furnished by dynamos on the locomotives, and conducted away by means of wires laid inside each rail along the tops of the ties and below the ballast. At intervals of 30 or 40 ft. there are projections of these wires rising nearly as high as the rails. The necessary connection with the locomotive is made by a plate extending beneath the engine and tender, longer than the distance between the projections, and swinging so that it is in constant contact with them. On each locomotive is an arrangement of bell and whistle whereby each may be rung by a current coming into the cab on one of the wires connected with the locomotive, whose dynamo is in connection with only one of the two wires between the rails. The other wire is in connection with the dynamo of the locomotive coming in the opposite direction. Each locomotive, as it were, sends out before it a current of electricity through one of the wires beneath, using the same wires for going in the same direction, and different wires if approaching each other. In the latter case the minute approaching locomotives enter upon the same section of wire the alarm is given in the cabs. A crossing is indicated to a train approaching it by means of a pedal, which, being pressed down by the flange of the wheel, makes a connection with the opposite wire, and causes the whistle to sound by means of the electricity generated in the same cab. Trains going in the same direction are also made to signal each other, and the departure of trains from one station is signaled to the station beyond.

Effect of Climate on Railroad Ties.

At a recent meeting of the Institute of Civil Engineers for Ireland, a paper was read on "Railroad Ties in Mexico," from which we extract the following: "The sleepers used are nine feet long, ten inches wide, and five inches thick. The selection of suitable wood for sleepers has occupied much attention. Good, well-creosoted Baltic sleepers have been tried on a large scale, and found to become decayed and useless at the end of about four years. Hard, strong oak sleepers, obtained in the country, have also been tried in large quantities, and found not to last more than three or four years. The timber of both the Baltic and oak sleepers seemed to undergo a rapid change and become quickly converted into a dry, spongy consistency.

"There was no appearance of insect ravages; the timber had evidently not been able to withstand the great heat or dryness of the atmosphere. The best wood yet discovered for sleepers is zapote. It is essentially a tropical timber, and is exceedingly durable for outdoor or indoor work above or below ground. Samples of this wood taken out of buildings, said to have been erected more than two centuries ago, did not show the slightest signs of decay; the wood was as sound as the day it was put into the building. This wood, however, is very scarce and very expensive. In color it is nearly as dark as logwood. It is very heavy and sinks in water' and is so hard that the boring of the holes for the spikes and forming the grooves for the rails is very laborious work. It appears to be almost impervious to decay, but it has a tendency to split if exposed to the heat of a tropical sun for a few months. For this reason the zapote sleepers must be kept equally covered with ballast.

"The next best quality of timber yet found in the country, and of which by far the greater number of the sleepers on the line are made, is sabino, a species of cedar. The general color of the wood is either a light yellowish brown or a light pink, and in appearance is very similar to the cedar used for ordinary lead pencils. It is a resinous wood, with a peculiarly fragrant odor, and is straight grained, readily worked, and does not appear to be attacked by any insects. In many of the very old buildings on the upper plains beams and posts of this timber are still standing, and show very little signs of decay. For sleepers it is very durable, and those that have been down for several years indicate that they are more likely to give way from the actual wearing or cutting in of the rail flange than from natural decay."

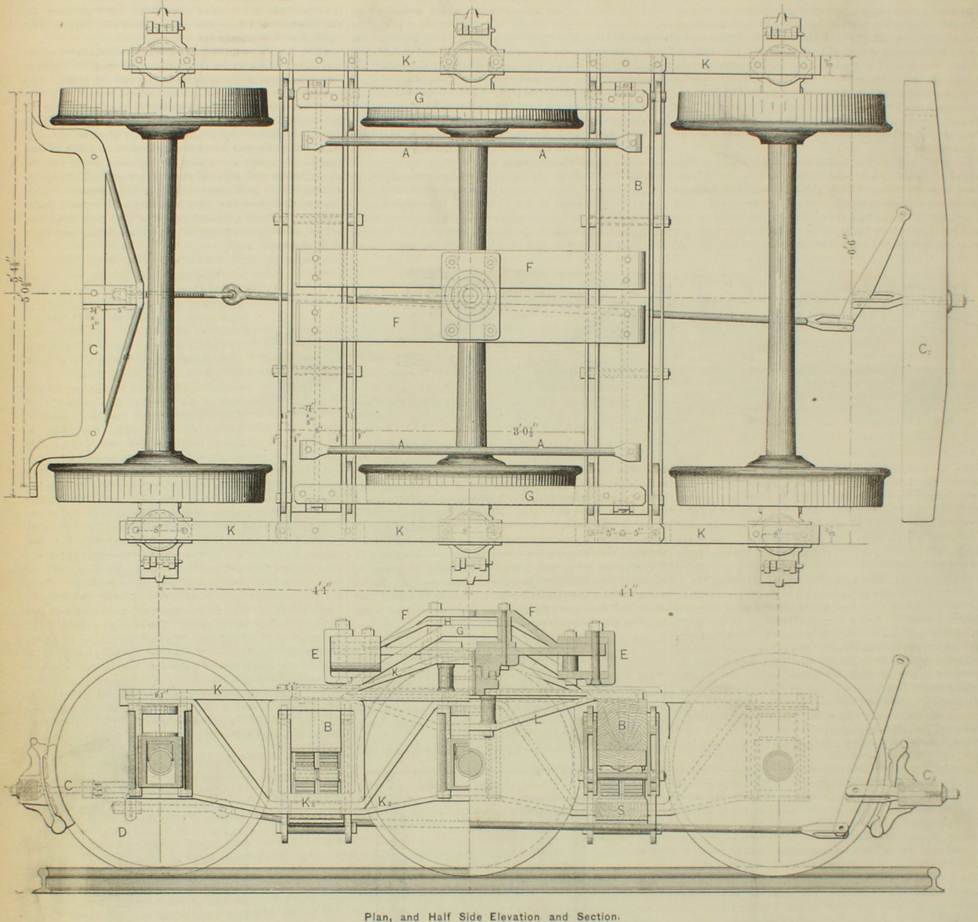
Here and there on some of the old lines of railroad can be found a few specimens of ancient car construction that present some interesting features when contrasted with modern methods. At almost any time within the past few years there could be found in the track yards of the New Jersey Division of the Pennsylvania Railroad some old freight cars of the ordinary box pattern, that were originally built for the Camden & Amboy road, and which have been in service nearly twenty years. The bodies are 27½ feet long, and although there is no longitudinal trussing, they are as straight as when they were built. The only trusses are two ⅞-inch rods running crosswise over the transoms, the stiffness of the bodies being dependent mainly upon the floor timbers, which are of yellow pine and oak. The side sills are 4½ × 8, the center sills 4 × 8, and the two intermediates 3½ × 8 inches. The transoms are 5 × 14. Two crosspieces, four feet apart, are bolted to the floor timbers underneath, and near the center. The pillars are bolted to the sills and plates. There are no mortises or tenons. The outside sheathing is ⅞ inch thick, and the roof is supported by oak carlines 2 × 2 inches, placed 16 inches apart. The average weight of the cars is about 18,000 pounds. We have no means of ascertaining the maximum weight of loads carried. It is claimed that the bodies of these cars are lighter, cheaper and more serviceable than many of the so-called improved modern styles of construction; and special attention is called to the fact that the bodies have kept straight all this time without the aid of truss-rods. The timber was, of course, sound and well selected, free from shakes and sap

With reference to forest destruction and tree planting, the *St. James Gazette* (London) remarks: The forests of the United States have been so mercilessly stripped of trees that a wood famine is almost inevitable in a few years. The lumbermen have been allowed to do practically as they pleased, and they seem to reap always and sow never. But an end is coming to that reckless method of procedure, and the lumbermen themselves are beginning to see that "something" must be done. That "something" can, of course, only be planting on a large scale. Happily, there is little fear of similar dearth in Great Britain; none, at any rate, until the great landlords are reformed out of existence. For almost the sole reason that England and Scotland are so thickly wooded, is the perseverance of the landed class in tree planting. One family alone, that of the Duke of Athole, has in a hundred years planted scores of millions of trees. The "landed duke," who commenced operations in 1774, planted 27,000,000 trees, covering 15,000 acres, principally upon the Dunkeld hills and in their neighborhood. The present Duke of Athole plants from 600,000 to 1,000,000 trees every year. The terrible storm which destroyed the Tay bridge blew down 80,000 of the Duke's trees, but the loss was hardly noticeable.

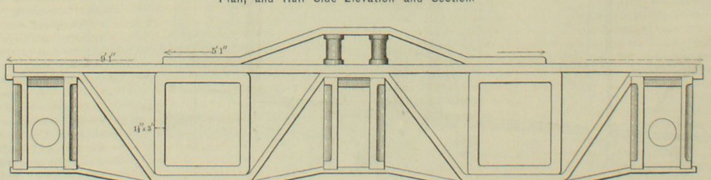
A Train of cars in Buffalo has become a wall of ice. The Buffalo *Express* describes it: "One of the most striking things on the lake front is a long train of cars on a siding next the open lake. They were hauled out there when the breakers began to run high, three days ago, in order to protect from ice the adjoining tracks. Some of these cars are empty and others loaded with lumber. There are, perhaps, a quarter of a mile of the cars. From one end to the other they are a solid wall of ice. Most of the cars cannot be seen at all. On the lake side the ice is two or three feet thick. The spaces between the cars are filled solid with ice, and the space between the wheels under the entire length of the train is a miniature Mammoth Cave—a gallery of stalactites and stalagmites."

SIX-WHEEL FREIGHT CAR TRUCK—CENTRAL PACIFIC RAILROAD.

Designed for a Car of 80,000 Pounds Carrying Capacity.



Plan, and Half Side Elevation and Section.



Side Framing.

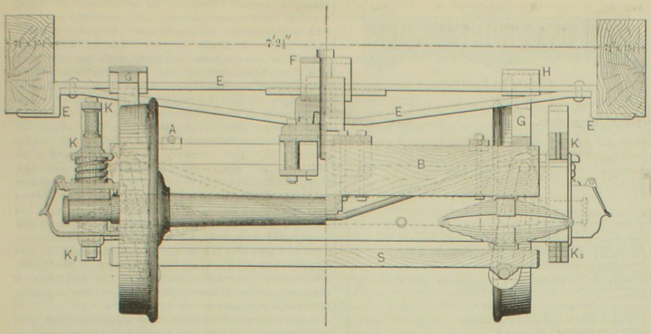
This truck is designed for a freight car with a carrying capacity of 80,000 pounds. We are, unfortunately, without specifications of the size of the car body and have no information as to the total weight of car or the weight on the journals. If, however, the limit of weight per journal should be placed at 9,000 pounds for the M. C. B. standard axle, as suggested by Mr. Blackall at the December meeting of the Car-Builders, Club, a pair of these trucks should be capable of carrying a total load on the journals of 108,000 pounds. Considering that double iron transoms are used, and that the side sills are 7¾ by 15½ inches, the weight of the car alone, less wheels and axles, cannot be much less than 28,000 pounds, leaving 80,000 pounds of paying load. The value of a car that can carry 40,000 pounds of freight on each truck will be appreciated upon roads where there are ore and stone to transport, or other material for concentrated loads.

The truck is of the type formerly known as the "California Truck." The sides consist of a deep truss formed by three arch-bars, the upper bar being 3 × 1½ in., the middle one 3 × 1 in., while the bottom bar is between ¾ and ⅞ in. in thickness. This form of truss, on account of its depth, and its short compression members, is a strong one. The side-bearings, carried over the central axle, are supported by a separate truss *F G*. The journal-box guides, and the irons by which the transoms are held are shown in the plan view, and are arranged in such a way as to form important members of the truss. The transoms themselves, as will be seen on the outside of the swing-beam *B B*, are formed of two ½ inch iron plates on the inside, and a ⅝ inch plate on the outside, separated by a space of 1⅛ inch. A section of these combined transoms is shown in the transverse half-section view. Short thimbles are used as distance-pieces to keep the plates apart. These, and the arch-bars, form the truck frame.

The rigidity of the frame in a horizontal plane is dependent upon the bolts and 1⅛ × 3 in. jaws which hold the transoms. The swing-beams play between the double transoms, and are firmly held by a system of bracing and trussing which carries the center-plate. There are two center-bearing arch-bars, each 6 × 1 in., bolted at the ends to the swing-beams, which are also connected by the round bars *A A* passing directly from one to the other, the ends of the bars being turned down into the timber. All these connections are very strong and heavy, but not more so than is required by the load to be carried. The spring planks *S S* are hung by four links each, the links standing in at a small angle and placed between the transom plates. Four 6-leaved elliptic springs are used on each, and are carried by pockets in the usual way. M. C. B. standard axles and oil boxes are used, and over each box is a spiral spring.

Owing to the unusual length of the truck, which is over 12 feet, the brake arrangement is somewhat peculiar. One brake-beam C^2 is of wood of the usual pattern. The other, shown at *C*, is of iron, trussed, and is arranged so as to extend as little as possible beyond the wheels, the total projection beyond the flange being equal to the thickness of the brake-head plus the nut and washer. A piece of blocking outside the twisted end of the iron beam is used to fill up the head of the shoe and make a firm hold for the bolt.

The depth of the swing-beam requires the brake-rod to be



End View and Section.

brought very low, and the bending of it so as to make the peculiar attachment shown at *D*. This consists of a flat piece of iron doubled over the beam and bent at right angles so as to form a drop through which a short rod is passed. This rod, by means of an eye, is attached to the lower brake-rod.

The transom *E E*, shown in the end view and section, is arranged so as to bring the center plate as high as possible and the sills low down. The sills are 15½ × 7¾ in., and the ends of the transoms are turned down and extended beneath the sills as shown. The transoms are double and are connected by strong braces, as shown in the side elevation, where *E E* are section and end view and *F F* the connecting and arch-bars.

The truck is about 8½ ft. from outside to outside of sill, and 6½ ft. outside the truck frame. The top of sills is a trifle less than 4 ft. above the rails, and the king-bolt, as shown in the drawing, is scarcely 6 in. from the under side of the floor. The swing-beams are 7½ in. square, and the spring-plank about 3 × 9 in. The brake beam is about 7½ in. wide and 4 in. thick.

The Cantilever System of Bridge Building.

The term cantilever is borrowed from a bracket or double bracket supported in the center as used in architecture, and here the architectural engineer and the mechanical engineer unite labors. The principle is here first applied to a bridge proper, but in constructing the road-bed for the West Shore Hudson River Railroad, essentially the same principle was applied where the bracket rested upon an abutment with one end inserted into masonry under the rock of the mountain, and the arm projected out over the water, upon which the track is laid. In the cantilever bridge there are two arms of the bracket, one extending over the river, the other toward the shore and secured to masonry. Upon the two arms reaching toward each other from each shore, a central span, or the bridge proper, is laid, connecting with each arm, but having the usual preparations for responding to the changes in temperature.

The shore arm of the cantilever or bracket rests upon a second pier, built back of the first one at the river's brink. If there was no such support, any weight—like that of a railroad train—if placed upon the shore arm, would depress it toward the ground and correspondingly elevate the outer or stream end. It would be as if, after perfectly balancing a plank on a log, you should place a weight at one end of the plank. But this is not enough. Suppose the railroad train has passed under the tower over the main pier out upon the cantilever or balanced beam; the extra weight would depress the outer end and at the same time elevate the inner or shore end. So the shore end not only rests upon a support of masonry, but is fastened to it to prevent the train from tipping the beam up into the air and falling into the stream.

For bridges having long spans the system is said to be the most economical. Less material need be used to secure the same strength, rigidity and stiffness than in a suspension bridge. Less false work or scaffolding is needed for the erection of a cantilever bridge than for any other braced structure, thereby making it capable of being constructed with more ease and less danger of disaster and with no obstruction to navigation. The central span resting upon the outer or stream ends of the two brackets, can freely expand with the heat of summer and contract with the cold weather. One end of this central span is fastened to one of the brackets, the other end being placed upon rollers. The deflection from the horizontal under the full load capacity of the bridge is not half so great as it would be in a suspension bridge of the same length of span.

By explaining, in a general way, the process of constructing a bracket or cantilever bridge, it is easy to see the economy and ease of the work. We will start with one iron tower built upon a pier of masonry on the east shore of a stream. The first panel of the bridge is swung into place for the shore arm of the bracket and fastened to this iron tower. A timber support for each panel as it is put into place is all the false work required in building the shore end. As soon as two of these panels are built by means of a derrick the first panel of the stream arm can be tied to the tower. The extra weight of two panels for the shore end of the bracket will fully sustain the single panel that is built out in the opposite direction over the water. With this done, that panel itself supplies the false work from which the next one can be placed in position and bolted to the first panel. In this way panel after panel can be advanced till the outer or stream arm of the cantilever is completed. Meantime, by keeping the work on the shore arm in advance of that on the outer arm, the weight of the latter will not overbalance the former, which, when completed, can be placed upon the second pier and anchored. Work goes on on both sides of the stream at the same time, and when ready the central span is thrown across. To do this needs the construction of scaffolding and derrick capable of holding up and drawing the central span across to place.

The cantilever system is capable of a great variety of additions and modifications. The arms may be thrown out from one central pier instead of from two near shore, and a roadway may be elevated above the railway track, or one may be suspended below the track, or both, if such were desirable, or the truss or bracket may be reversed and built entirely above the pier so as to be a low bridge and still offer no obstruction to high water.

Communications.

Poor Timber and Shoddy Cars.

To the Editor of the National Car-Builder:

I wish to enter a protest against what is called shoddy work in car construction, and in doing so I may reflect a little upon some master car-builders who have a reputation for doing good work. Not long since an accident occurred on our road in which an apparently well built and handsome passenger car belonging to another road was damaged by breaking one of the side sills. I need not mention names or go into details. Some of your readers, however, may recognize the circumstances as they may appear in what follows. Our company proposed to repair the sill by putting in a good ship-splice. But the owners would not consent to this, and insisted on having an entirely new sill put in or else the payment of a good round sum to cover the damage. To this proposition I demurred, and told our superintendent that the demand was outrageous. He said that the parties seemed to have the dead open-and-shut on us, and for a time things looked blue.

I then decided to give the damaged car a careful inspection, which led to the discovery that each side sill, instead of being one piece of timber, was made of three pieces; and be it remembered that the car in its general appearance was strictly gilt-edged, was not a contract car, but had been built to order by one of the loudest establishments in the country. The broken sill was, of course, repaired with a splice, and this gave the owners a bone to pick with the builders.

I can not but regard it as scandalous for reputable builders to put spliced sills into passenger cars of any class Even when the splicing is done as well as it possibly can be done there is necessarily a great loss of strength as compared with the strength of a sill without joints. I would not like to trust one of them in ordinary service even, saying nothing of accidents and other emergencies. As I have already said, there were three splices in each outside sill, and probably as many in the intermediate and center sills. The builders, in order to work in short stuff and save a small profit, had deliberately sacrificed at least half the strength of the wood, knowing, as they must have known, that these timbers, more than any other, are the backbone of the whole structure, and upon the strength and integrity of which the safety of passengers is dependent in case of accident.

A locomotive on a Western road a few months ago run into the rear of a train, telescoping the rear car and wrecking it completely. I do not know that the sills of the car were spliced, but it is very probable that they were, or the longitudinal resistance to the engine would have stopped it at the transom instead of allowing it to go nearly to the forward end. In the case of the car on our own road the smash-up would have been more complete had the blow been received squarely across the car end.

From a penny-wise saving in sills we may pass to the same kind of economy in the matter of timber. Georgia or Southern pine is a material in the use of which Northern contract builders make the worst blunders and skin their patrons most thoroughly; and it must also be said that the roads skin themselves in the same way when they use this timber to any extent in the construction of their own cars in their own shops. When anything is said about the quality of the sills, the car-builder says he does not order virgin pine because it cannot be had. He has to accept a little sap and a few knots for the reason, I suppose, that if he orders clear stuff he can't get it. An examination of the Southern pine lumber stock in most of our Northern car shops shows that a considerable portion of it is inferior in quality and altogether too poor for the work it will have to do when it is made into cars. A glance at the sawed and dressed sills in the wood-working shops reveals the fact that the trees from which they came have been tapped until the life and strength of the wood are very much reduced. If some of our car-builders would speak out they would acknowledge, first, that they do not know a piece of good, first-class pine when they see it; and, secondly, that the price of good timber is so high that they dare not ask for it.

Passenger cars must have heavier and stronger truss-rods if shoddy building is to continue, and even then it will be found that the cars are not as strong as they should be to stand the ordeal of collisions. The same may be said in regard to the long and heavy freight cars that are now being built. The strains incident to heavy trains and locomotives will tell on the center sills. There is not much complaint about the failure of these sills now, because the drawing attachments are so light that they are crippled first, and in this way the sills are saved. It would therefore seem to be inexpedient to strengthen the draw-gear very much unless the sills are made stronger, and this can only be done by using a better quality of timber. The drawing attachments are easy to get at, and can be repaired at a comparatively small cost. The great number of them to be repaired requires a heavy expenditure in the aggregate, yet I know that the repairing and replacing of center sills will be far more expensive if the necessity for it becomes more frequent. I suppose it is only a question of time, and not a very long time either, when the drawing attachments will be so strong as to stand the jerking and pounding of the heaviest trains. Unless the truss-rods can be depended on to protect the sills, we may wish when it is too late that we had stuck to the ten-ton loads.

What I have written may seem like croaking or crying wolf. If so, I would like to hear from the other side of the house.

INSPECTOR.

The Construction of Light Passenger Coaches.

To the Editor of the National Car-Builder:

I have some comments to make on the subject of light-weight cars and the way in which they should be built. What I shall say is suggested mainly by an editorial article in your last issue under the head of "Dead Weight."

I will start with the proposition that a passenger car that will seat 76 passengers can be built that will not weigh over 40,000 pounds, and at the same time have 42-inch wheels and a body 57 feet long. The paper wheels will average about 1,000 pounds each, and the two 4-wheel trucks will weigh about 5,000 pounds more than the same kind of trucks with 33-inch iron wheels. With the large wheels, the weight of the car body must not exceed 23,500 pounds, and in order to provide for contingencies it should, perhaps, weigh a little less than that. To build a car of this description, and have it strong enough to stand the wear and tear with no more repairing than is needed upon ordinary cars, it will be necessary to deviate considerably from the kind of workmanship employed in most car shops. The light and small stuff commonly used in joints and in fitting will not answer, because it lacks strength. The distrust which most builders have of any reduction of the sizes of timber in car framing, is doubtless owing to their knowledge of the weakness of joints and connections as they are usually made. When a carline is cut down to ⅝ of an inch and is made of two pieces, or when a post is reduced to ⅞ of an inch, no expert is needed to tell us that the screws must not be driven with a hammer. A workman upon light cars must learn how to drive a nail; and what is still more important, he must know when to stop using his hammer. The need of this kind of knowledge will be manifest to any experienced builder who examines a piece of passenger-car framing in almost any of the shops. The chances are that a dozen places will be found where the joints are more or less crippled by hammer-blows that have been struck without reason. This, in the common run of work, is no very serious matter, but it is almost ruinous where small pieces are used in good and light work.

The importance of gluing, in car work, is generally conceded; but we hear little said about the difficulty of getting this part of the work well done. Many builders do not take the trouble to find out what brand of glue is best adapted to the work in hand, and consequently miss the advantages to be derived from the use of a good article. There is one kind which partakes of the quality of fish glue that is of great value in car work. It is more fluid and adhesive than the common kinds, is much stronger, and costs five or six cents a pound more. This glue, when applied to the end of the grain, will hold so firmly that a 30-inch stick, say an inch square, with a glued joint in the centre, can not be broken with the hands. Common glue, carelessly made, often remelted and used when half chilled, is of very little account. Yet I have heard workmen say that when they glued on their panels the glue was so cold as to be little better for holding the surfaces together than so much putty. In order to derive the greatest benefit from the use of glue, suitable clamps must be provided for the different parts of the work, and the pots must be kept hot all the time. We all know if canvas is put on the panels and turned up on the posts, the job is very nearly perfect; but the difficulty is to get the glue thoroughly rubbed into the corners. The shortest way out of the trouble is to cover the whole inside of the panel with canvas, and then glue it to the posts, using both brads and screws to secure it. This is better than doing it poorly the other way, and the work is sufficiently strong.

The so-called "ship-splice" is another feature in construction that is likely to suffer from poor workmanship. Not long since, while inspecting some cars under construction, I found a ship-splice in a top plate that was rendered of no account by the zeal of some workman who had driven the screws so hard as to split the plate at each end of the splice, thus making a weak place where strength was very essential. Both the key and the screws should be driven just enough and no more, and the workman who does not know when to stop driving is lacking in judgment as an intelligent mechanic.

In regard to the thickness of outside paneling opinions differ. In former times they were ¾ of an inch in thickness, and many car-builders thought this was about right. Now, however, some builders use ⅝-inch panels and find them to be fully strong enough if well canvased on the inside. Panels even thinner than this have been used and have done good service, but the canvas was turned up on the posts and well glued into the corners, and the glue was kept very hot. Just how thin a panel can be used with safety appears to be an open question. My own opinion is that ⅝-inch should be the minimum thickness, when the canvas is not turned up on the posts and attention given to the corners and glue, as above stated.

A great deal of unnecessary work is expended upon passenger car roofs that might be dispensed with to advantage. The most of it consists in putting in useless timber that only burdens the construction without adding to its strength. Generally speaking the whole wood framing of the sides of the clear-story or raised roof is so much superfluous lumber that the short carlines have to carry. In many of these roofs the carlines are so much curved that their strength is only that of the wood with the grain running diagonally or crosswise, and consequently with such carlines the roof construction cannot be lightened without weakening it. The furring also, as it is usually put in, is practically useless. But this is not necessary by any means. On the contrary, it may be made to contribute very much to the strength of the roof by designing it as a part of the roof framing and getting it out in advance. It can then be gained into the carlines or posts of the deck, and do good service as an integral part of the structure. In the long run this is the cheapest way, although it necessitates more preparatory work than the common method. If a light and strong car is wanted, the blocking must be prepared with as much care as the various parts of the frame. In fact, the master car-builder should be the inspector of his own work as respects the dimensions of sticks, and especially blocking, and see that none of it is an encumbrance instead of a help to the strength and stability of the structure.

I am strongly of the opinion that light passenger cars are a paying investment, and that the extra labor and care required in the building of them is not fruitlessly expended. In heavy traffic such cars stand up under the work as well as the heavier ones. They require no larger outlay for repairs; and if the testimony of those who have opportunities for knowing is to be credited, they do not suffer any more in the general run of accidents.

M. C. B.

THE shops of the New York, West Shore & Buffalo road at Frankfort, N. Y., are all grouped radially around a 60-foot turn-table in the center. This plan was proposed by the late Howard Fry and has many advantages over other arrangements of shops, inasmuch as it allows for unlimited extension without lessening the facilities for handling the material. Close to the turn-table and between it and the main tracks the store-house is located, which brings this building in a central position and nearly equi-distant from all shops to be supplied. The various buildings, including the blacksmith and boiler shops, foundry, main erecting and machine shop, etc., are arranged at a radius of 150 feet from the center of the table, so that the raw material can be supplied to the shops at the ends remotest from the turn-table, and the machinery has been so arranged that the work passes from one machine to another until it reaches the end nearest the turn-table in a finished condition and ready to be transferred to the erecting shop.

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EDITORIAL ANNOUNCEMENTS.

Addresses.—*Business letters should be addressed, and drafts and money orders made payable, to* THE NATIONAL CAR-BUILDER. *Communications for the attention of the Editor should be addressed* EDITOR NATIONAL CAR-BUILDER.

Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consinder of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.*

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RAILWAY PASSENGER STATION BUILDINGS.

The improvement in the style and construction of passenger stations is one of the marked features of railway progress. There were at first no existing models for this class of structures, and their development from rude beginnings was necessarily slow, but it has fairly kept pace with that of cars, engines, and the multitude of improved appliances in railway operation. Originally the station-house, even in England, was a mere shed for temporary shelter, and well deserved to be called a "temple of discomfort," as they were designated by Mr. Ruskin—places which nobody felt inclined to visit except from sheer necessity, and which it was a flagrant impertinence to embellish with the least particle of ornament. But the questionable theories of the great art critic in this respect have yielded to the requirements of progress. The passenger station-houses in England are many of them elaborately designed, and in their ornamental features are exceedingly attractive, while those upon our own roads exhibit a constant improvement in architectural design, embellishment, and adaptation to the uses required. Every new structure that supersedes an old one, either for terminal or way purposes, is a great improvement upon its predecessor in every way. Those erected during the last few years display almost every kind and combination of material, as well as style of construction and finish, that the resources of engineers and architects can devise. There is, of course, much that is fantastic, extravagant and inappropriate that will in time be corrected.

A station building for passengers should be adapted to its uses. The ticket and telegraph offices and waiting and eating rooms should be so arranged as not to bewilder people in their efforts to find them or to get away from them. There should be roofed platforms of ample width, and as much daylight as possible every where. These requisites being provided, all else should be subordinate. There are many way stations of the middle class as to size and cost, that are not lacking in convenience of location and internal arrangement, yet they have, nevertheless, a kind of forbidding aspect produced by a dinginess of materal and sombre finish, combined with small windows and the exclusion of light by projecting roofs. This, it seems to us, might be remedied to a great extent by a larger use of iron and glass, especially in platform roofs and their supports. The body of the building, whether it has one or two stories, should have skylights over the principal rooms, letting in an abundance of light, making them more cheerful, and revealing any neglect in the matter of cleanliness. If platform roofs were made of heavy vitrified material sufficiently opaque to intercept the sunlight, with the plates set in a light framework of iron, and with slender iron pillars along the outer edge, it would be an improvement upon present construction. This style of transparent roof is much used in Europe, and frequently extends some distance over the track. We can not but think that the passenger station buildings yet to be erected in this country—and there will be thousands of them—will contain more iron and glass, and to that extent be more airy, elegant and graceful in appearance than our present ones, and none the less convenient and lasting. Many of the present ones are sadly lacking in these respects, while here and there—in Toledo and Schenectady, for example—may be seen antique relics of a primitive era, in the last degree unsightly, forlorn and dismal. The Grand Central Depot, in New York, is a conspicuous example of the use of iron and glass in large stations, and it is difficult to see why these materials are not equally applicable to smaller ones.

In the matter of decoration, these materials admit of a variety of treatment that can hardly fail of being attractive. Iron has long since taken its place in architecture. It can be cast and wrought into all sorts of forms, and with the aid of color these forms can be made highly ornamental and effective, especially in the framework of roofs, supporting pillars, and the various kinds of lighter erections. There are imposing and beautiful things, architecturally, in many great structures that are out of place in railway station buildings. Castellated turrets, stately porticoes, clustered columns, groined arches, sculptured pediments, and the like, are all excellent in their way, but they do not comport with the uses of railways. A flying buttress would not look well on a great terminal station. A true artist will not attempt to fabricate "frozen music" by grouping together a motley and discordant jumble of architectural fragments that have no natural cohesion. Railways in all their belongings are indissolubly associated with the roaring turmoil and activities of life, and station-houses, in their design and construction, should conform to their specific uses by suggesting nothing that is incongruous, ludicrous and inappropriate.

THE CARRYING CAPACITY OF FREIGHT CARS.

The discussion upon this subject at the December meeting of the Car-Builders' Club, a very full report of which was given in our last issue, is instructive as showing the complicated nature of the question and the opposite views that are held by railroad men as to the expediency of a general increase in the size and capacity of freight cars. While an off-hand discussion of this kind is necessarily somewhat discursive and unsystematic, it serves to bring out the salient points as well as the reasons pro and con, that have weight with different minds. With perhaps one exception, those who took part in the discussion were inclined to take a conservative view of the matter, and to consider a carrying capacity of 20 tons as the limit of economy in general traffic, however desirable it may be at times to exceed this limit. The admitted fact that loads very much exceeding 20 tons are frequently put into cars of the nominal capacity of 40,000 pounds, with no apparently bad results, is not conclusive of the question, but only raises another and more perplexing one as to what shall be the final limit, in view of the progressive tendencies of railroads and the possibilities of the future.

The more the subject is agitated the more evident it appears that no satisfactory decision can be reached without a thorough analysis of all the elements and conditions of the problem; and it is also evident that no such analysis is possible without a better knowledge of a multitude of facts pertaining to the details of freight transportation than is now attainable, except in a loose, fragmentary and uncertain way. These facts relate to the kind of freight carried; the proportions of through and local freight; the weight and speed of trains and the handling of them by brake appliances; the number of cars in trains and the mixing of light and heavy cars in the same trains; the effect of increased weight and speed on rails and bridges; the comparative cost of repairs upon light and heavy cars; the relative proportion of dead weight to paying load; the weight on journals; the limit of capacity of 33-inch iron wheels, and the axles and drawing attachments now in use; the maximum length of car bodies; and a host of minor considerations that need not be enumerated.

Railroad freight tonnage has increased enormously within the past ten years, and it is constantly becoming more diversified. Articles are carried every year of a kind that were never carried before. In fact, there seems to be no limit in this country to the growth of freight traffic. So great is the diversity in weight and bulk of the innumerable products transported, that the average car load actually carried is not likely to be the same on any two roads, especially if one of them carries through freight in one direction mainly, and the other carries way freight in both directions. An average of car capacity that would do very well for one road would not do so well for the other. On general principles it would seem that a car of such a size, weight and construction as would adapt it to the carrying of an average weight of load, irrespective of bulk, on a particular line of road, through or local, would be the most economical for that road, because the capacity of the car would be like the average—a medium between extremes. It might run some of the time with less than a full load, but in such case the deficiency would be less than if its capacity was greater. But will it do to assume that because the average load carried on one or two lines is an index of what the size and weight of the cars should be for those lines, that the general average of loads carried on all the roads of the county must in like manner determine the capacity of all the cars? Such a theory is as absurd as the idea of uniform rates per mile for all distances.

Another consideration is the comparative weight of trains and the number of cars in each. Here is where the advocates of large cars and heavy loads have their strongest hold. The greater the carrying capacity the longer and heavier must be the car, because the cubic space can not be increased to any considerable extent except longitudinally, and that lengthens the distance between the truck centers and increases the ratio of strength, stiffness and weight required in the car body, comparatively as in the span of a bridge. But this, it is claimed, is more than offset by having a less number of cars in a train, and at the same time carrying heavier train loads. The fewer cars in a train in proportion to train load implies, of course, the hauling of a less number of trucks and drawing attachments, and the saving of that much wear and tear and cost of repairs. This is a forcible argument, or would be if it were not proposed to increase the weight and speed of trains as well as the size and capacity of cars. The present speed of from 12 to 15 miles an hour is expected to be increased to 25 and even 30 miles, which will necessitate more effective brake appliances than are now in general use on freight trains, also stronger drawing attachments and perhaps better wheels. The weight on journals and the strength of axles must also be looked after. It is very easy to say that if the axles and journals are not strong enough, make them stronger, and if the wheels are not large enough and good enough, make them larger and better. Let nothing stand in the way of progress. In regard to the comparative cost of repairs of light and heavy cars, it is to a great extent an open question, the importance of which depends on the proper adaptation of drawing and running gear to the two classes of cars. All that is now known about it is little better than mere opinion.

In view of the diversity in freight traffic, both as respects the kinds of freight and the distances between points of shipment and destination, the attempt to ascertain the specific weight of load that is the most economical for all cars would seem to be about as difficult an undertaking as to decide upon the most economical size for all houses or all dry-goods boxes. It would, of course, be less difficult to determine what is the most desirable capacity for cars carrying full loads, in one direction at least, on through lines, say between the West and the seaboard, and which are kept on such lines and carry such return freight of miscellaneous products and merchandise as can be obtained. Still less difficult would it be to determine the best capacity for cars that are to carry but one product, or two or three products of the same class, say coal, ore or iron, and be kept together on the same roads and run in trains by themselves. In such case there is a basis of uniformity upon which to reason, compare and estimate, and draw conclusions that are not fallacious. We question whether the carrying capacity of coal cars, even, can be determined by any general agreement or understanding among different roads; but it will be done, if done at all, by the individual roads themselves, according to the requirements of the traffic as ascertained by the judgment of the managers. An oil line, with its tank cars running in trains by themselves from terminus to terminus, can have them of a uniform capacity, and as heavy as the rails and bridges can stand; but it will hardly do to reason from these to merchandise cars, as if the traffic and all conditions were the same.

IRON AND STEEL FOR AXLES AND CRANK-PINS.

At the last meeting of the New England Railroad Club, in Boston, Mr. Lauder's remarks in regard to the relative value of iron and steel for car axles and locomotive crank-pins threw some light on the question as to the best material for this purpose, and at the same time brought out some facts which have been frequently alluded to, but never before, we believe, so definitely stated. Mr. Lauder has had a long and not altogether satisfactory experience with steel axles and pins. The wear of the steel axles he found in all cases was more rapid than that of first-class iron axles. The steel axles also gave no small amount of trouble by heating, and in certain cases which he cited, and of which the particulars were afterward given, the heating became so great an inconvenience as to make it necessary to condemn them. During his recent experience in Mexico he had a four-wheel switching engine sent him with steel pins, the main rod, of course, being outside the parallel rod. After being in use for some time one of these pins "let go" and wrecked the engine. Knowing the nature of the material, and fearing to replace it with the same kind, a new pin was made from a good hammered iron car axle, and gave no trouble, although the steel pin on the other side caused some anxiety. Since Mr. Lauder's return to the States the same engine has been wrecked a second time by the breaking of the steel pin on the other side. Some discussion followed this statement, and the conclusion reached seemed to be that the soft and elastic metal was really the secret of the difficulty. Its softness caused it to wear with greater rapidity than the iron, while its elasticity caused it to bend under, and this in turn produced the heating and was probably the ultimate cause of the breakage.

It is not an unheard-of thing for engine builders of long experience in stationary work to prefer a hard hammered iron for pins to any other material. The practice of quite a number of builders whose work stands high in making pins for extraordinary loads points in the same direction. The pin itself is often made of the stiffest material which can be procured, and the wearing surface formed by a steel sleeve shrunk upon the pin, hardened and ground true. The utmost hardness is thus obtained on the surface, while the strength and stiffness of the hammered iron is retained for the centre of the pin. It has been the fashion to demonstrate the superior value of any kind of steel over iron as a material for journal bearings, by pointing to marine engineering and the excessive loads put upon the crank-pins and journals of ocean steamers; but after all, the frequency of hot bearings at sea has always been rather too great to make the demonstration as conclusive as could be wished, even by the advocates of steel pins. What seems to be wanted for car journals and locomotive crank-pins is a hard, stiff metal, and the trouble seems to have been, not so much that the metal was steel, as that it was not of the proper grade. If made sufficiently hard it was admitted that the wear would be no more than that of iron. If, at the same time, the metal can be made stiff, there will be no reason to expect heating.

SMALL DISCOMFORTS IN RAILWAY CARS.

There are many little discomforts to which passengers in railway cars are subjected that are even more annoying than some of the greater ones that are recognized as inevitable. Many of these petty annoyances, however, can be got rid of by giving them proper attention and making use of the right means. During the winter season, and especially upon roads in the northern section of the country, there is more or less complaint about cold drafts from car windows, which cause discomfort and sometimes even more serious mischief before they are noticed. This trouble can be entirely prevented by making the windows air-tight. To do this it is not enough to put weather strips around the sash. The cold air often gets in in spite of the weather strips, and this is due to defects in the fitting and finishing. The sash is sometimes badly fitted at the top, in which case a current of cold air is felt by persons sitting underneath, and they are unable to trace it to its source. Very large-sized glass in windows is also a disadvantage in winter, for the reason that it is a serious tax upon the heating apparatus. The arrangements for ventilation are often more effective for letting in fresh air than is necessary, and although the temperature in the car is kept up to the requisite point, as indicated by the thermometer, there is an unpleasant sensation of exposure to air currents. Some of the new cars on northern lines are as breezy in severe weather as a March morning, a state of things that can be remedied by lessening the number of exhaust openings to correspond with the volume of warmed air admitted; or, in other words, the inflowing and outflowing currents should be adjusted as far as possible so that warming and ventilation can be kept up without causing a sensation of too much or too little of either. Cold air is not necessarily healthful, nor is warm air detrimental to health as long as it is pure. There are fanatics on the subject of ventilation who fancy they are being poisoned and suffocated unless they feel the wind blowing on them at the rate of ten miles an hour, whether the temperature is high or low.

Another annoyance which ought to be abated is the banging of car doors. It is not expected, of course, that conductors and brakemen will close a car door every time as gently as they would the door of a sick-room. Under the circumstances, they must use doors as they find them. The trouble is certainly remediable, and the remedy must be provided by the car-builder. The use of air-springs is not necessary. Suitable buffers can be provided, which act only when the door shuts, and, in fact, have already been provided, although only to a very limited extent. Suggestions, however, are almost needless when the available remedies are so abundant and inventive ingenuity so ready to put them into practical shape. In their application care should be taken not to make the door difficult to open, nor should there be any unnecessary complication. In this connection, it may not be amiss to suggest that the existing door-stops, or catches, are open to improvement. As a rule, they do hold the door open when they get a good hold, but the trouble is to make them let go.

The catalogue of minor discomforts might be extended without risk of querulous fault-finding. It would be invidious, however, not to mention the train-boy with his prize-candy, literature and peanuts. Whether he is a discomfort to passengers is perhaps one of the open questions that can only be definitely settled by a vote. His occupation is certainly a paying one, or he would not stick to it as he does, and he conld not make it pay unless people encouraged him by buying his wares.

PAINT FOR IRON SURFACES.

A writer in one of our exchanges gives a number of reasons for using red lead as a coating for wrought iron work, and comes to the conclusion that this substance is by far the best material for the purpose. Most of the paints containing linseed oil have the property of absorbing oxygen from the atmosphere and giving it up to the iron with which they are in contact, provided the iron has begun to rust. The paint, by this constant absorption, is impaired, or more properly burned up, and when in contact with iron oxide is robbed of its oxygen and protects only the parts that are clean and free from rust. This action, however, is not universal. There are some paints which form so stable a compound with oil and oxygen as not to become decomposed by rust. The advantages, then, of red lead are, that it dries easily with linseed oil, and does not require a drier. After drying it remains sufficiently elastic as not to be affected by the expansion and contraction of the iron. When it has been put on thickly it hardens without shriveling and forms a tough insoluble coating. The writer referred to mentions the use of red-lead paint by calico printers, gas-pipe fitters, ship-builders and wagon and plow-makers, as sufficient proof that the paint will resist moisture and protect iron. The following are his directions for mixing and using:

> "For those among us who are uninstructed how to mix pure red lead for paint, it should be made known that pure red-lead powder, after being slightly pressed down with the finger, shows no lead crystals. When they are visible, it is merely partly converted, and not first quality. It should be ground in pure old linseed oil, and if possible used up the same day, to prevent it combining with the oil before it is applied, losing in quality. No drier is necessary, as in the course of a few days the oil forms a perfectly hard combination with the lead. American linseed oil is as good as any imported, where the manufacturer has given it age, and not subjected it to heat, as is the custom, by steaming it in a cistern, to qualify it quickly for the market. It deteriorates in quality when heated above 160° F. This red-lead paint spreads very easily over a surface, and the best of finish can be made with it, even by a novice in painting."

Too much stress can not be laid on the importance of having the iron perfectly clean and free from rust when the paint is applied; and it is even said that for perfect protection the iron should be bright, or there is danger of rusting. The iron in the trucks of railway cars receives, when running, an excellent protective coating by a combination of mineral oils and dust, these oils having but little affinity with oxygen.

SHODDY CONSTRUCTION.

We print elsewhere the views of a correspondent in regard to certain alleged defects in the construction of passenger cars. These defects, or rather abuses, consist not only in the use of inferior timber in the floor framing, but in the further weakening of the structure by putting in spliced sills. So far as such practices prevail—and that they do prevail to some extent, at least, the positive statements of our correspondent are pretty good evidence—they are a departure from the recognized principles of good construction that is not creditable to builders or railway companies, nor is it fair dealing with the traveling public. We are inclined to think that the splicing of the floor timbers of passsenger cars is by no means a common practice with builders, and that it is only done in exceptional cases. Still, it is none the less, but all the more, deserving of condemnation, for the reason that if the practice is tolerated at the start it is bound to increase. Strength is the one indispensable thing in a railway car, and if good sound timber to build them with is becoming so expensive and so difficult to obtain as to compel the use of an inferior quality or a resort to tricks of construction, or both, then we say increase the cost of cars to the companies, and let the companies seek remuneration by higher rates of fare. Either this, or dispense with some of the excessive and superfluous ornamentation in inside and outside finish that is now so prevalent.

In respect to Southern pine, which is being used more and more in the construction of cars, the supply is abundant and will continue so for a good while yet; but unless the predictions of a timber famine are delusive, the time will come when it will be less abundant. The accessible portions of the Southern pine forests have for years been largely taxed for turpentine, which no doubt impairs to some extent the strength and durability of the timber. But still, such timber makes very good cars, but not quite as good as the untapped virgin growth which is now more remote from lines of transportation and consequently more expensive to obtain. The truth is that almost every kind of desirable timber for structural purposes is bound to increase in price and at the same time deteriorate in quality as the better grades become thinned out, thus compelling the use of inferior grades and the practice of economies of all sorts in building in order to save a profit in the competition for contracts. In the building of cars, whether the material used is mainly wood or iron, there is a limit to cheapening devices that cannot be overstepped without adding to the cost of repairs and renewals to an extent that more than offsets any saving in first cost.

WARMING STREET CARS.

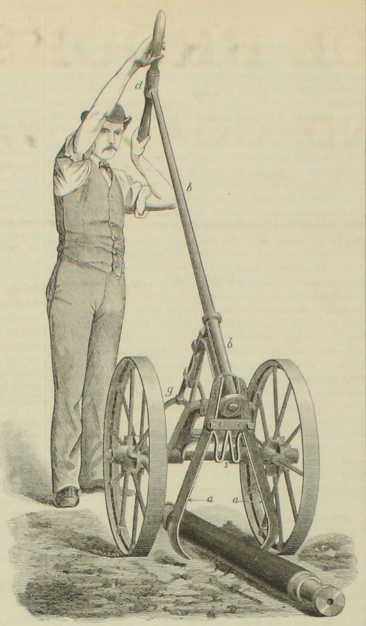
In an article in our last issue we referred to the general adoption by the street railway companies of Brooklyn of the system of warming their cars with stoves, and said that, so far as we knew, none of the cars running on the street lines of New York had stoves in them. Our information in regard to the New York lines was not in accord with the facts, and we now take pleasure in saying that there are at least two lines in this city that have their cars warmed, namely, the Third Avenue and the Second Avenue. The first-named company commenced putting stoves in its cars early in the Fall, and all or nearly all of them are now comfortably warmed. The stoves are of the same kind as those used in Brooklyn, and are placed inside the cars in the same way. The Second Avenue cars are warmed by a small furnace or heater attached to the under side of the floor upon one side, and midway between the wheels. The fire is, of course, fed and regulated from the outside. A pipe conducts the smoke to a corner of the car, where it is carried to the roof by a vertical pipe. The heated air is let into the car through perforated tin registers immediately over the furnace. This arrangement, while it does not encroach upon the seating capacity, makes it uncomfortably warm for those who sit over or near the registers. The inside stove is unquestionably the best arrangement of the two, and has, so far as we can learn, given general satisfaction to passengers on all the lines where it has been introduced. In Brooklyn it has ceased to be an experiment, and the Third Avenue company will not be likely to abandon it after putting stoves in all its cars. It is safe to predict that next winter a large proportion of the surface roads of New York city will follow the example of the Third Avenue line.

POOR WHEELS AND HARD-RIDING CARS.

A Western car-builder, not long since, put a new passenger car into service in the suburban traffic of his road, and not long after was taken to task by the General Manager because the car was a hard-riding one. Although it was to all appearance like a number of other cars of the same class that had been built by the road, yet there was no question as to the unsatisfactory nature of its riding qualities. Complaints from the patrons of the road became so frequent, that the car was taken out of service and sent to the shops to see if the cause of the trouble could not be discovered and remedied. The running gear was examined and overhauled and a new set of springs put in. The car was again put on the road, but without any perceptible improvement in its performance. The complaints were renewed and the car was again taken to the shops and a second set of springs put in, including both elliptics and equalizers, but with no better success. The superintendent and master car-builder made repeated trips in the car, but without obtaining even a clue to indicate the real cause of the difficulty. As a last resort the car was provided with a pair of trucks that had been running under an easy-riding car, and then there were no more complaints about the hard riding. The fault was evidently somewhere in the trucks, and in order to settle this point beyond dispute, the trucks that had been taken out were put under a car that had always ridden well, and on the first trip it was found to ride as hard as the first named car. A new wheel-grinding lathe had just been put into the shops, and the wheels of the defective trucks were trued up. The cause of the trouble was soon revealed. All, or nearly all, of the eight wheels were found to be out of round, the eccentricity in some of them amounting to an ⅛ of an inch.

This incident shows the importance of thoroughly testing the accuracy of wheels before putting them in service, and also illustrates the peculiar and unsuspected difficulties car-builders have to contend with in their efforts to serve their employers and the public.

THE *Northwestern Lumberman* says that there has been a current belief in the Northern States that yellow pine will not hold paint satisfactorily. It has been thought that any exudation of pitch would stain the paint, and to a certain extent force it off. This idea, however, has been greatly magnified. In sections of the Southern States where little besides yellow pine is used for building purposes, there is usually heard but little complaint. Occasionally a builder will put a coat of alcohol over the outside work, which cuts any pitch there may be on the surface, but oftener no special process is employed. The color of yellow pine, when left in its natural state, or oiled, is bright and enlivening. If its brightness is offensive to some tastes, it may be modified and sobered by oil, and it will darken with age. By careful culling of the heart from the outer wood, very fine effects in shading may be produced.



Ball's Improved Automatic Truck.

The engraving represents a standard truck for handling car and locomotive axles, iron beams, girders, etc. It consists of a crank axle mounted on a pair of wheels, to which are attached a pair of tongs and a shaft with a handle by which the truck is operated. The tongs *a a* are kept apart by a spring *s* just below the plate to which the two limbs are pivoted, and are closed by a combined cylindrical and elliptical cam attached to the lower end of the shaft or tongue *b b*. By raising the shaft, as shown in the cut, and rotating it so the major axis of the cam is vertical, the upper ends of the tongs are brought together and the lower ends spread so as to grasp the axle or other object to be taken up; then by turning the handle of the shaft so as to bring the major axis to a horizontal position, the upper ends of the tongs *f f* are spread and the lower ends brought together with their curved extremities underneath the axle to be lifted and carried. At the end next the operator is a guide or fork *g*, which is lowered with the shaft and keeps the rear end of the axle from tipping up when it is held with its center of gravity forward of the tongs. With slight modifications in the operating appliances, these trucks can handle with great facility bar iron, timber, mounted car wheels, piping, etc., the large wheels making the transportation very easy. With the form of truck shown in the cut one man can load, transport and unload a locomotive axle, hot or cold, with the greatest labor-saving rapidity. The highest premium medals were awarded to these trucks at the Chicago, Cincinnati and Pittsburg expositions, and they are fast becoming an indispensable appliance in railway machine shops. They are manufactured by the Automatic Truck Works (John Terhune, Manager), Midland Park, New Jersey.

American Street Railway Association.—We have received from the Secretary a copy of the second annual report of this Association. It is admirably printed and edited, and contains a verbatim report of the proceedings of the last annual meeting, which was held in Chicago on the 9th and 10th of October, 1883. The membership now represents 63 street railways, two of which are Canadian companies. The Treasurer's report shows the total receipts since the organization of the Association in December, 1882, until October, 1883, to have been $1,640, of which there is a balance of $193 remaining in the treasurer's hands. Reports were made by committees on the following subjects: Track Construction; Labor and Wages; Buildings; Horseshoeing; Motive Power, and Collection of Fares. Special committees were also appointed to report upon a number of subjects at the annual meeting, among which are: Electricity as a Motive Power; the Cable System; Ventilation and Lighting of Cars, and a Uniform System of Accounts. The discussions are chiefly upon the regular reports of committees. Aside from these, the subjects of Street Car Heating and Car-Starters were very fully discussed. There is also a supplementary report of the speeches made at the banquet held on the occasion at the Grand Pacific Hotel, in which numerous toasts were responded to in a way which makes very pleasant reading even to those who did not participate in the social conviviality which inspired it. The report also contains some illustrations of rails for street railway tracks. The next regular meeting of the Association will be held in New York on the third Wednesday in October next.

THE Woodruff Sleeping & Parlor Coach Co. have removed their general office from Pittsburgh to No. 430 Walnut street, Philadelphia.

MR. H. B. LA RUE, of Hornellsville, N. Y., has been appointed traveling agent for the Brooks Locomotive Works, with authority to submit specifications and quote prices.

BRADLEY'S CUSHIONED HELVE HAMMER received the diploma of honor and grand medal of merit at the Centennial Exhibition in 1876; the first premium silver medal at the New York American Institute fair in 1873; and at Cincinnati Industrial expositions in 1874, 1880, '81, '82 and '83.

THE firm of Nathan & Dreyfus, 92 and 94 Liberty street, New York, has been dissolved. The business will be continued by the "Nathan Manufacturing Co.," of which Max Nathan is President. William Toothe Vice-President, and Jacob W. Mack Secretary and Treasurer.

MESSRS. GEORGE A. OHL & CO., of Newark, N. J., have bought an interest in the Cornice Machine patents and Trade Mark, and will hereafter have the exclusive right to manufacture the machines. The business will be conducted in the name and trade mark of "The Calvin Carr Cornice Machine Co."

MR. F. T. LERNED AND MR. W. L. GAREY have become connected with the firm of Andrews & Clooney, of New York, manufacturers of car wheels and car springs. Mr Lerned has hitherto been connected with the Baltimore Car Wheel Co., and in his new capacity will fill the responsible position of Genera Agent of the above-named firm and assume the entire charge of its sales department.

A YOUNGSTER being required to write a composition upon some portion of the human body, selected that which unites the head to the body, and expounded as follows: "A throat is convenient to have, especially to roosters and ministers. The former eats corn and crows with it; the latter preaches through his'n, and then ties it up. This is pretty much all I can think of about necks."

"You folks don't seem to be troubling us much yet," remarked the superintendent of an old railroad to the superintendent of a new rival line. "I would have you know," was the reply, "that we make better time than you every day and on long trips can beat you by a full hour." "Possibly," answered the first, "but you see as there is no one to get on or off you don't lose any time at stations."—*Philadelphia Call.*

Our Directory.

We note the following changes since our last issue. Our readers will do us a great favor by giving us prompt notice of any changes that may come to their knowledge or of any errors that may be noticed in our list:

Baltimore & Ohio.—J. G. Foreacre has been appointed General Manager of the Trans-Ohio Divisions in place of B. Dunham, resigned.

Boston, Barre & Gardner.—Harry M. Marshall, General Freight Agent, has been appointed Superintendent in place of Henry M. Witter.

Burlington & Missouri River in Neb.—Z. E. Calvert, formerly Chief Engineer of this road, has been appointed Superintendent.

Chicago & Northwestern.—J. M. Boon has resigned the position of Superintendent of Motive Power.

Chicago & West Michigan.—A. M. Nichols has been appointed General Superintendent.

Cincinnati, New Orleans & Texas Pacific.—The office of General Master Mechanic is abolished, and James Meehan, in charge of that department, will in future be known as Superintendent of Motive Power and Machinery.

Danbury & Norwalk.—Chas. M. Crawford has been appointed General Superintendent, vice L. W. Sandiforth, resigned.

Georgia Pacific.—I. Y. Sage has been appointed General Superintendent of this road, in place of J. G. Foreacre, resigned.

Hartford & Connecticut Valley.—O. M. Shepard has been appointed Superintendent. He is also Superintendent of the Shore Line and Air Line Divisions of the New York, New Haven & Hartford road.

Lake Shore & Michigan Southern.—W. L. Gilmore is appointed Master Mechanic of the Michigan Southern Division. Office and shops at Elkhart, Indiana.

Louisville & Nashville.—Bradford Dunham has been appointed General Manager. C. O. Parker is Superintendent of St. Louis Division, with office at Montgomery, Ala. J. G. Metcalfe is appointed Superintendent of the Louisville, Cincinnati & Lexington Division, and W. P. Harris Superintendent First Division, Main Stem, and Knoxville Division.

Minneapolis & St. Louis.—T. E. Clarke, heretofore Assistant Superintendent, has been appointed Superintendent.

New York, West Shore & Buffalo.—James D. Layng has been appointed General Manager in place of Mr. Charles Paine, resigned. Mr. Layng recently resigned the position of General Superintendent of the Chicago & Northwestern road.

Old Colony.—The announcement that Geo. W. Reynolds had resigned the position of Master Mechanic of the Northern Division is not correct.

Pittsburgh & Western.—Thos. M. King has been elected Vice-President and General Manager of this company. J. T. Johnston has been appointed Superintendent, with office at Allegheny, vice W. C. Mobley.

Rochester & Pittsburgh.—J. T. Gardiner has been appointed General Superintendent.

Sinaloa & Durango.—John E. Bell has been appointed Master Mechanic, vice W. P. Dutton deceased.

Toledo, Cincinnati & St. Louis.—Frank F. Allen has been appointed Superintendent of the Illinois Division, with office at Charleston, Ill.

Employment.

Advertisements will be inserted under this heading for one dollar for each insertion.

WANTED.—A position as Master Car-Builder, or as Foreman of new work in a Railroad Car Shop. Have had twelve years' experience in the building of passenger coaches, drawing room and sleeping cars, and am also familiar with freight car construction. Can furnish the best references. Address "R. C.," office of the NATIONAL CAR-BUILDER.

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RAILWAY AND COACH VARNISHES,

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MAKERS OF STRICTLY FIRST-CLASS

Railway Varnishes,

AND MANUFACTURERS OF

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PENNSYLVANIA CO., Wm. Mullins, General Purchasing Agent, Pittsburg, Pa.
BALTIMORE & OHIO RAILROAD CO., N. S. Hill, Purchasing Agent, Baltimore Md.
CHICAGO & ALTON RAILROAD CO., A. V. Hartwell, Purchasing Agent, Chicago, Ill.
CHICAGO & NORTHWESTERN RAILROAD CO., R. W. Hamer, Purchasing Agent, Chicago, Ill.
LEHIGH VALLEY RAILROAD CO., L. Chamberlin, Purchasing Agent, Philadelphia, Pa.
NORTHERN RAILROAD OF CANADA, F. W. Cumberland, Superintendent, Toronto, Ont.
NAUGATUCK RAILROAD CO., G. W. Beach. Superintendent, Waterbury, Conn.
PHILADELPHIA, WILMINGTON & BALTIMORE RAILROAD CO., S. A. Hodgman, Superintendent of Motive Power, Wilmington, Del.
NEW YORK, NEW HAVEN & HARTFORD RAILROAD CO., R. N. Dowd, Commissary, New Haven, Conn.
UNION PACIFIC RAILROAD CO., } A. D. Clark, Purchasing Agent, Omaha, Neb.
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CHICAGO, BURLINGTON & QUINCY RAILROAD CO., Wm. Irving, Purchasing Agent Chicago, Ill.
LOUISVILLE, CINCINNATI & LEXINGTON RAILROAD CO., Wm. Mahl, Purchasing Agent, Louisville, Ky
GRAND TRUNK RAILWAY N. Wall, Port Huron, Mich.
LITTLE ROCK & FORT SMITH RAILROAD CO., T. Hartman, Purchasing Agent, Little Rock, Ark.
GILBERT & BUSH CO., Troy, N. Y. }
WASON MANUFACTURING CO., Brightwood, Mass. }
BILLMEYER & SMALL MANUFACTURING CO., York, Pa. } Railroad Car Builders.
JACKSON & SHARP CO., Wilminton, Del. }
BARNEY & SMITH MANUFACTURING CO., Dayton, O. }

The advantages derived from the use of such Special Colors are many, a few of which are found below: **ABSOLUTE UNIFORMITY OF SHADE. DURABILITY,** as we use perfectly pure materials. **SAVING OF MONEY,** because of small quantity required. **SAVING OF TIME,** in the putting on of the same. **SAVING OF LABOR AND MATERIAL,** as no extra amount of Varnish will be required to hide a sanded surface **LARGER DEGREE OF CERTAINTY** that there will be an absence of cracked work, as our mixtures are all uniform, being done by weight only.

We make any desired shade, it only being necessary that purchasers furnish us with sample of color desired, stating the time they would like to have the paint dry in.

We shall be glad to furnish samples and give prices to any who may wish to avail themselves of the above advantages.

Very respectfully

JOHN W. MASURY & SON, New York and Chicago.

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CASTINGS FOR RAILWAY AND CAR-BUILDERS A SPECIALTY.

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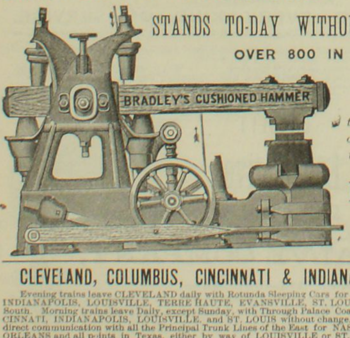
BRADLEY'S CUSHIONED HAMMER

STANDS TO-DAY WITHOUT AN EQUAL.

OVER 800 IN USE.



It approaches nearer the action of the Smith's arm than any hammer in the world.

BRADLEY & CO.,

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[Established 1832.

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TRADE MARK.

Having largely increased the capacity of our Foundry or Casting Department, and introduced all the new improvements in order to facilitate business, we are now prepared to fill orders for castings of every description with promptness and dispatch, made either of our "Ajax Metals" or of any Alloy our patrons desire, at the lowest rates a new first-class composition can be made. Our specialty is car brasses or Bearings bored to size, and coated with our Patent Adhesive Metal. To this Adhesive coating we invite special attention, as it proves to be what is desired for a solid brass bearing. We shall be pleased to submit sample brasses coated with this Metal to any Master Car-Builder or Master Mechanic that desires same.

We will make special prices in large lots to Locomotive and Car Builders. Correspondence solicited.

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CLEVELAND, COLUMBUS, CINCINNATI & INDIANAPOLIS RAILWAY.

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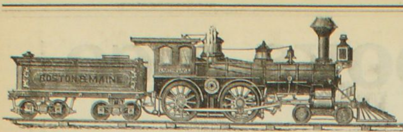

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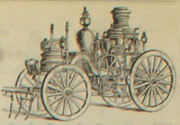

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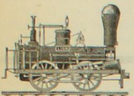
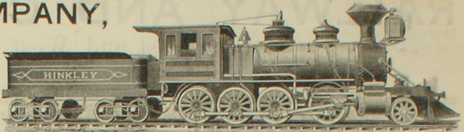


LION, 10 TONS, HINKLEY, 1839.



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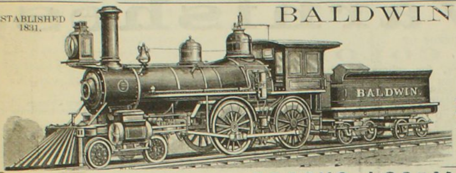

Adapted to every variety of service, and built accurately to standard gauges and templates. Like parts o different engines of same class perfectly interchangeable.

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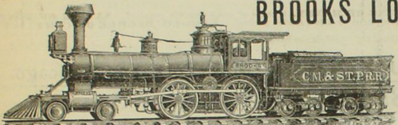

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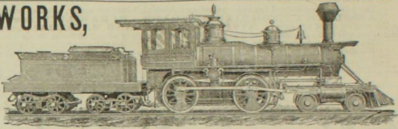

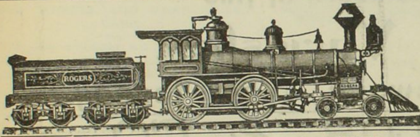

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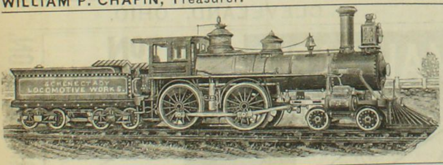
SCHENECTADY LOCOMOTIVE WORKS.

SCHENECTADY LOCOMOTIVE WORKS.

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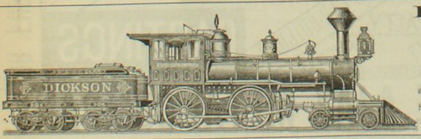
SCHENECTADY, N. Y.



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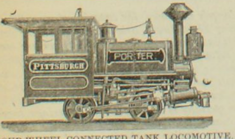

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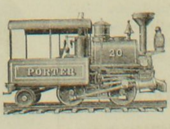

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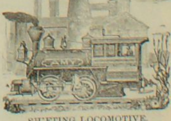

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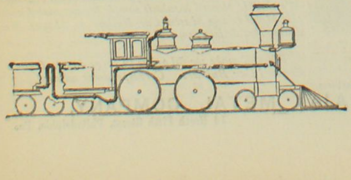

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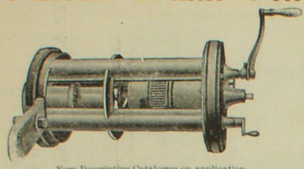
The Ashton Blow-back Safety-valve is constructed so as to conduct the escape steam which is blown off back to the tender, or to the smoke-box and up the chimney. By this arrangement the heat of the escape steam, instead of being wasted as it is when an ordinary safety-valve blows off, is communicated to the cold water in the tender. This not only results in an important economy, but it renders the escaping steam noiseless, and the increase of temperature of the water has a tendency to deposit some of its impurities before it is pumped into the boiler. It thus *stops the noise! saves fuel! and all engines steam better and faster, and do more effective work with these valves* than with those in ordinary use.



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For Turning off CRANK PINS in Position, and while WHEELS are UNDER Engine.

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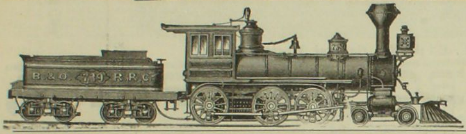

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PITTSBURGH, PA.
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Tanks, Locomotive or Stationary Boilers Furnished at Short Notice
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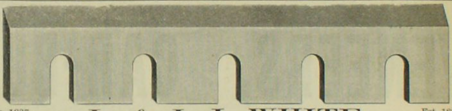

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Used by the Principal Railroads in the United States, and Warranted Unexcelled.
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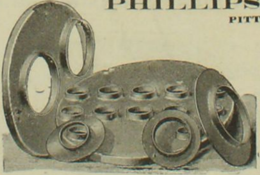

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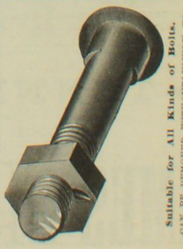

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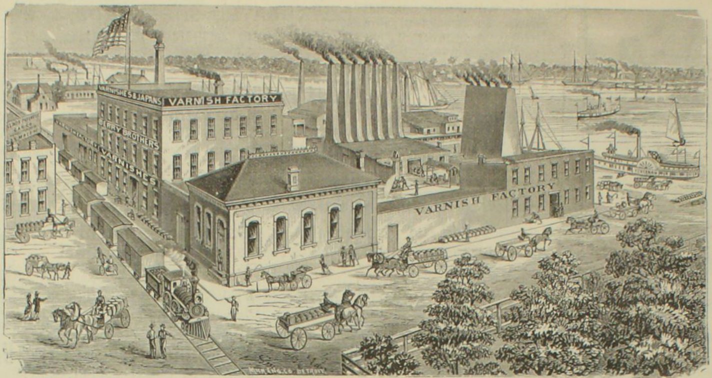

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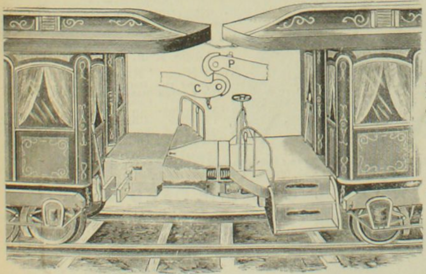

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"Entire Satisfaction"—"Perfect Satisfaction" are the words used by R. F. Smith, Gen'l Manager Cleveland & Pittsburgh R. R.; Hiram Fowler, Supt. Connecticut Valley R. R.; J. W. Thomas, Gen'l Supt. Nashville, Chattanooga & St. Louis Ry.; J. G. Sawyer, Master Car-Builder same road, and many others.

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of the Railroads of the United States and Canada, showing the gauge, length of road, number of locomotives and number of cars; and giving the names and titles of their principal officers in charge of the operating, purchasing and rolling stock departments.

A

Adirondack R. R. 4-8½ gauge 60 m. 3 lo. 62 cars.
C. E. Durkee, *Supt* ....Saratoga, N. Y.
Jacob Myers, *M. M* ....Saratoga, N. Y.
Jas. J. Traver, *M. C. B*....Saratoga, N. Y.
Addison & Northern Penn'a Ry. 3 g. 46 m. 5 lo. 50 c.
F. M. Baker, *Gen. Supt*....Addison, N. Y.
Alabama Great So'n R. R. (*See Cin., N. O. & T. P.*)
Albany & Susquehanna R. R. (*See D. & H. Canal Co.*)
Albemarle & Raleigh R. R. 4-8½ g. 33 m. 3 lo. 35 c.
Jas. H. Petty, *Gen. Supt*....Tarboro, N. C.
Albert Ry. 4-8½ g. 51 m. 3 lo. 35 cars.
G. A. Robinson, *Man. & Pur. Agt.* Hillsboro, N. B.
Jas. McKay, *M. M. & C. B*....Hillsboro, N. B.
Alexandria & Fredericksburg Ry. (*See Penna. R. R.;*
Alexandria & Washington R. R. (*7*) *Div.*
Allegheny Valley R. R. 4-9 g. 259 m. 70 lo. 2202 c.
David McCargo, *Gen. Supt. & Pur. Agt.*; and
C. B. Price, *Supt.* (Riv. Div.)....Pittsburg, Pa.
A. A. Jackson, *Supt.* (L. G. Div.).Reynoldsville, Pa.
Geo. W. Glass, *M. M*....Verona, Pa.
R. Gunning, *M. C. B*....Verona, Pa.
Alliance, Niles & Ashtabula R. R. (*See Penna. Co.*)
Annapolis & Elk Ridge R. R. 4-8½ g. 20 m. 4 lo. 29 c.
W. H. Bians, *Supt. & Pur. Agt*..Annapolis, Md.
John L. Beall, *M. Mach*....Annapolis, Md.
Antwerp & Paulding R. R. 4-8½ g. 6 m. 4 lo. 63 c.
E. C. Munson, *Gen. Man*....Antwerp, O.
William Fitzsimmons, Jr., *Pur. Agt.* Antwerp, O.
Arkansas Midland R. R. 3-6 g. 63 m. 4 lo. 45 cars.
A. H. Johnson, *Pr. & Gen. Man*...Helena, Ark.
J. B. Johnson, *M. M. & M. C. B*...Helena, Ark.
Asheville & Spartanburg R. R. 5 g. 49 m. 2 lo. 12 c
Jas. Anderson, *Supt. & Pur. Agt*..Spart'b'g, S.C.
M. M....Spartanburg, S. C
W. B. Brown, *M. C. B*....Spartanburg, S. C.
Ashland Coal & Iron Ry. 4-8½ g. 22 m. 7 lo. 432 c.
Douglas Putnam, Jr., *Gen. Supt.* Ashland, Ky.
Robt. Peebles, *Pur. Agt*....Ashland, Ky.
E. M. Roberts, *M. M*....Ashland, Ky.
Ashtabula & Pittsburgh Ry. (*See Penna. Co.*)
Atchison, Topeka & Santa Fé R. R.
4-8½ g. 2,620 m. 348 lo. 9,629 cars.
A. E. Tonzelain, *Gen. Man*....Topeka, Kan.
Geo. B. Harris, *Gen. Man. Asst*...Topeka, Kan.
Gen. Supt....Topeka, Kan.
Geo. Hargraves, *Pur. Agt*....Topeka, Kan.
Geo. Hackney, *Supt. Lo. & Car. Dept.* do.
Clem. Hackney, *Asst. Sup. L. & C. Dept.* do.
Eastern Div.: D. J. Chase, *Supt.*..Topeka, Kan.
Henry Hull, *G. F. Car Dept*....Topeka, Kan.
John Fagan, *M. M*....Atchison, Kan.
J. M. Smith, *M. M*....Kansas City, Mo.
Alfred Taylor, *M. M*....Emporia, Kan.
Mid. Div.: H. R. Nickerson, *Supt.* Nickerson, Kan.
W. Y. Johnson, *M. M*....Nickerson, Kan.
J. Q. Adams, *M. M*....Dodge, Kan.
W. Div.: D. H. Rhodes, *Supt*....La Junta, Col.
A. C. Stiles, *M. M*....La Junta, Col.
D. H. Dotterer, *M. M*....Raton, N. M.
So. Div.: Geo. L. Sands, *Supt*....Las Vegas, N. M.
F. B. Woodruff, *M. M*....Las Vegas, N. M.
J. H. Holman, *M. M*....Wallace, N. M.
J. W. Sager, *M. M*....San Marcial, N. M.
H. P. Olcott *M. M*....Deming, N. M.
Sonora Div.: 265 m.
L. H. Waugh, *M. M*....Guaymas, Mex.
Kan. Cy., Law. & So. Kan.
4-8½ g. 399 m. 24 lo. 787 c.
J. L. Barnes, *Supt*....Lawrence, Kan.
T. D. Volk, *M. M*....Ottawa, Kan.
Atlanta & West Point R. R. (*See Western of Ala.*)
Atlantic & North Carolina R. R. (*See Midland; N. C.*)
Atlantic, Tenn. & Ohio R. R. (*See Rich. & Dan.; (2) Div.*)
Atlantic & Pacific R. R. 4-8½ g. 575 m.
F. W. Smith, *G. Supt*....Albuquerque, N. M.
A. West, *Pur. Agt*....Chicago, Ill.
Geo. Chalender, *Supt. M. P. & M.*, and
Geo. Chalender, *Div. Supt*..Albuquerque, N. M.
D. Hardy, *Div. Supt*....Williams, Ariz.
Augusta & Knoxville R. R. (*See Port Royal & Aug.*)
Austin & Northwestern R. R. 3 g. 60 m. 4 lo. 86 c.
H. W. McNeill, *Gen. Man*....Austin, Tex.

B

Bachman Valley R. R. (*See Han. Junc., Han. & Gett.*)
Balt. & Delaware Bay R. R. 4-8½ g. 50 m. 2 lo. 13 c.
Fred Gerker, *Gen. M. & P. A.* Chestertown, Md.
Baltimore & Hanover R. R. (*See H. J., H. & G.*)
Baltimore & Ohio R. R.
4-8½ g. 1,612 m. 571 lo. 15,897 cars.
S. Spencer, *2d V. P. & Gen. Man.* Baltimore, Md.
N. S. Hill, *Pur. Agt*....Baltimore, Md.
E. Ohio Riv. Div. 4-8½ g. 972 m.
W. M. Clements, *Mast. Trans*...Baltimore, Md.
A. J. Cromwell, *Act. M. of M*....Baltimore, Md.
L. Packard, *M. C. B*....Baltimore, Md.
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Sam. Houston, *M. M*....Piedmont, W. Va.
Robert Maxwell, *M. M*....Cumberland, Md.
S. B. Crawford, *M. M*....Grafton, W. Va.
Alex. Laird, *M. M*....Parkersburg, W. Va.
Chas. Hirsch, *M. M*....Wheeling, W. Va.
Pitts. Div.: T. M. King, *Gen. Supt*...Pittsburg, Pa
J. E. Sampsell, *Ast. M. of M* Connellsville, Pa.
Trans-Ohio Divs.: J. G. Foreacre, *G. Man* Newark, O.
W. H. Harrison, *Asst. M. of Mach*..Newark, O.
E. L. Weisgerber, *M. M*....Newark, O.
H. M. Ingler, *M. M*....Bellaire, O.
O. B. Perkins, *M. M*....Zanesville, O.
Andrew Beckert, *M. M*....Sandusky, O.
F. J. Gunther, *M. M*....Chicago Junction, O.
Chi. Div.: *Gen. Supt*..Chicago, Ill.
Benj. Lowther, *M. M*....Garrett, Ind.
W. H. Wilkinson, *M. M*....Kingston, Ill.
Baltimore & Philadelphia. 4-8½ g. 20 m. 4 lo. 35 c.
D. Connell, *Supt*....Wilmington, Del.
Baltimore & Potomac R. R. (*See Penna. R. R.; (7) Div.*)
Bangor & Piscataquis R. R. 4-8½ g. 63 m. 4 lo. 87 cars.
Arthur Brown, *Supt. & Pur. Agt*..Bangor, Me.
C. S. Nason, *M. M*....Bangor, Me.
J. W. Comins, *M. C. B*....Oldtown, Me.
Bangor & Portland Ry. 4-8½ g. 25 m. 3 lo. 3 c.
C. Miller, *Pres*....Blairstown, N. J.
Barclay R. R. 4-8½ g. 16 m. 6 l. 200 c.
F. F. Lyon, *Supt*....Barclay, Pa.
J. A. Hardenburg, *Pur. Agt*..21 Cort. st., N. Y.
Wm. Johnson, *M. M*....Towanda, Pa.
Batesville & Brinkley R. R. 3 g. 25 m. 2 lo. 34 c
Wm. Black, *Pres. & Gen. Supt*..Brinkley, Ark.
W. J. Thompson, *Gen. Man*..Little Rock, Ark.
R. B. Davis, *Pur. Agt*....Brinkley, Ark.
John White, *M. M*....Brinkley, Ark.
Baton Rouge, Grosse Tête & Opelousas R. R.
5-6 g. 29 m. 3 lo. 12 c.
D. C. Montan, *Gen. Supt*....Port Allen, La.
Bedford & Bloomfield Ry. 3 g. 43 m. 5 lo. 65 cars.
Jas. W. Kennedy, *Gen. Supt. & Pur. Agt.*; and
Capt. Geo. Elliott, *M. M*....Bedford, Ind.
Richard G. Elliott, *M. C. B*....Bedford, Ind.
Bellaire, Zanesville & Cin. Ry. Co. 3 g. 42 m. 5 lo. 71 c.
S. L. Mooney, *Gen. Supt*....Woodsville, O.
J. B. Hong, *M. M*....Bellaire, O.
Bell's Gap R. R. 3 g. 23 m. 4 lo. 148 cars.
R. G. Ford, *Supt*....Bellwood (P. O.), Pa.
A. Zimmerman, *M. C. B*....Bellwood, Pa.
Belt R. R. 4-8½ g. 12 m. 10 lo.
W. P. Ijams, *Supt*....Indianapolis, Ind.
Bennington & Rutland Ry. 4-8½ g. 59 m. 10 lo. 236 c.
F. C. White, *Supt. & Pur. Agt*..Bennington, Vt.
G. W. Blanchard, *M. M*....Rutland, Vt.
Berlin Branch R. R. (*See Han. Junc., Han. & Gett.*)
Bingham, Canyon & Camp Floyd (*See Den. & Rio Gr.*)
Bladen, Columbus & Florida. 4-8½ g. 16 m 2 lo. 2 c.
John Colville, *Pres*....Wilmington, N. C.
Bodie Lumber Co. 3 g. 34 miles.
Thomas Holt, *Supt. & Pur. Agt*....Bodie, Cal
E. M. Luckett, *M. M. & C. B*....Bodie, Cal.
Boston, Barre & Gardner. 4-8½ g. 36 m. 8 lo. 108 c.
H. M. Marshall, *Supt. & P. A*..Worcester, Mass.
Chas. F. Brigham, *M. M*....Worcester, Mass.
Boston, Concord, Montreal & White Mts. R. R.
4-8½ g. 167 m. 40 lo. 1,116 cars.
W. A. Stowell, *Supt*....Plymouth, N. H.
Geo. W. Storer, *Pur. Agt*....Boston, Mass.
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G. A. Ferguson, *Asst. M. M*..Lake Village, N. H.
L. D. Pickering, *M. C. B*....Lake Village, N. H.
Whitefield & Jefferson Div.:
A. L. Brown, *Supt*....Whitefield, N. H.
Boston, Hoosac Tunnel & W'n Ry.
4-8½ g. 87 m. 18 lo. 1,038 cars.
H. L. Morrill, *Gen. Man*....Saratoga, N. Y.
Pur. Agt....Mechanicville, N. Y.
C. H. Cory, *Supt. & M. M*..Mechanicville, N. Y.
John S. Ellis, *M. C. B*....Mechanicville, N. Y.
Boston, Revere Beach & Lynn R. R. 3 g. 9 m. 7 lo. 46 c.
C. A. Hammond, *Supt. & P. Agt.* Boston, Mass.
J. L. Folsom, *M. M*....Boston, Mass.
John Coghlan, *M. C. B*....Boston, Mass.
Boston, Winthrop & Point Shirley R. R.
3 g. 10 m. 1 lo. 8 c.
C. A. Parks, *Gen. Supt*....Boston, Mass.
J. W. Davis, *M. M*....Boston, Mass.
Boston & Albany R. R. 4-8½ g. 372 m. 245 lo. 6,111 c.
W. H. Barnes, *Gen. Supt*....Boston, Mass.
E. Gallup, *Asst. Supt*....Springfield, Mass.
A. B. Underhill, *Supt. M. P*...Springfield, Mass.
F. D. Adams, *Gen. M. C. B*....Allston, Mass.
H. B. Chesley, *Div. Supt*....Boston, Mass.
G. H. Colby, *Div. M. M*....Boston, Mass.
C. E. Grover, *Div. Supt*....Springfield, Mass.
H. W. Eddy, *Div. M. M*....Springfield, Mass.
J. B. Weston, *For. Car Sh.* Springfield, Mass.
W. H. Russell, Jr., *Div. Supt.* E. Albany, N. Y.
T. B. Purvis, *Div. M. M*...East Albany, N. Y.
J. E. Doran, *For. Car Sh*..East Albany, N. Y.
Boston & Lowell R. R.
4-8½ g. 140 m. 73 lo. 1,231 cars.
C. H. Mellen, *Supt*....Boston, Mass.
F. H. Nourse, *Pur. Agt*....Boston, Mass.
J. F. Crockett, *Supt. T. & Mach*..Boston, Mass.
Boston & Maine R. R. 4-8½ g. 206 m. 89 lo. 2,100 c.
J. T. Furber, *Gen. Supt. & P. A*..Boston, Mass.
Geo. J. Fisher, *Pur. Agt*....Boston, Mass.
Wm. Smith, *M. M*....Boston, Mass.
D. C. Richardson, *M. C. B*....Lawrence, Mass.
Boston & N. Y. Air Line R. R. (*See N. Y., N. H. & H.*)
Boston & Providence R. R. 4-8½ g. 67 m. 52 lo. 1,006 c.
A. A. Folsom, *Gen. Supt. & P. A.* Boston, Mass.
Geo. Richards, *M. M*....Roxbury, Mass.
Jno. Lightner, *M. C. B*....Roxbury, Mass.
Bowling Green R. R. 4-8½ g. 6 m. 2 lo. 4 c.
Wm. A. Wiggins, *Gen. Man.* Bowling Green, O.
D. W. H. Day, *Pur. Agt*...Bowling Green, O.
Bradford, Bordell & Kinzua R. R. 3 g. 42 m. 6 lo. 82 c.
Bradford, Eldred & Cuba. 3 g. 54 m. 6 l. 158 c.
Tonawanda Valley & Cuba. 3 g. 60 m. 6 lo. 31 c.
B. C. Williams, *Gen. Man. & P. A*..Brad'fd, Pa.
Jno. Delaney, *M. M. & C. B*....Bradford, Pa.
Brattleboro' & Whitehall R. R. 3 g. 36 m. 3 lo. 56 c.
(*Operated by Central Vermont.*)
Breakwater & Frankford R. R. (*See Del., Md. & Va.*)
Bridgton & Saco River R. R. 2 g. 16 m. 2 lo. 19 c.
Geo. E. Mansfield, *Gen Supt*...Bridgton, Me.
M. M. Caswell, *M. M*....Bridgton, Me.
Brighthope Ry. 3 g. 37 m. 4 lo. 193 cars.
Jas. R. Worth, *Supt*....Richmond, Va.
E. B. Thaw, *Pur. Agt*....Richmond, Va.
A. Gary, *Supt. Way & Works.* Winterpock, Va.
Alex. Calder, *M. M*....Chester, Va.
Brooklyn, Bath & Coney Island R. R.
4-8½ g. 7 m. 6 lo. 36 cars.
Geo. A. Gunther, *Gen. Man*...Brooklyn, N. Y.
Isaac G. Ring, *M. M*....Brooklyn, N. Y.
Brooklyn, Flatbush & Coney Island Ry.
4-8½ g. 7 m. 7 lo. 54 c
Robert White, *Supt*....Brooklyn, N. Y.
Brooklyn & Rockaway Beach R. R.
4-8½ g. 3 m. 2 lo. 18 cars
Wm. Warner, *Supt*...East New York, N. Y.
Brunswick & Western R. R. 5 g. 172 m. 13 lo. 170 c.
H. S. Morse, *Gen. Man*....Brunswick, Ga.
R. D. Meader, *Supt*....Brunswick, Ga.
W. K. Wallace, *Pur. Agt*....Brunswick, Ga.
W. R. Kline, *M. M*....Brunswick, Ga.
Buff., N. Y. & Phil. R. R. 3 & 4-8½ g. 655 m. 120 l. 6,339 c.
Oliver Watson, *Gen. Man*....Buffalo, N. Y.
Geo. S. Gatchell, *Gen. Supt*....Buffalo, N. Y.
W. W. Halsey, *Asst. to G. Supt*..Buffalo, N. Y.
J. H. Poole, *Pur. Agt*....Buffalo, N. Y.
Allen Vail, *Supt. M. P. & M*....Buffalo, N. Y.
Buff. Div.: P. G. Dwyer, *Supt*....Buffalo, N. Y.
Roch. Div.: R. M. Patterson, *Supt.* Rochester, N. Y.
N. G. Div.: J. W. Watson, *Supt*....Olean, N. Y.
Riv. Div.: A. Vandivort, *Supt*....New Castle, Pa.
Pitts. Div.: E. H. Witter, *Supt*....Oil City, Pa.
H. J. Bookhammer, *M. M*....Oil City, Pa.
John Monks, *M. C. B*....Oil City, Pa.
Burlington, Cedar Rapids & Northern Ry.
4-8½ g. 713 m. 76 lo. 2,813 cars.
C. J. Ives, *Gen. Supt*....Cedar Rapids, Ia.
Robt. Williams, *Supt*....Cedar Rapids, Ia.
T. Stickney, *Pur. Agt*....Cedar Rapids, Ia.
R. W. Bushnell, *M. M. & C. B.* Cedar Rapids, Ia.
Burlington & Lamoille R. R. 4-8½ g. 35 m. 4 lo. 64 c.
G. L. Linsley, *Gen. Man. & Supt.* Burlington, Vt.
F. G. Brownell, *M. M., M. C. B. & P. A.* do.
Burlington & Mo. Riv. R. R. (in Neb.) (*See C. B. & Q.*)
Burlington & North-West'n Ry. 3 g. 38 m. 3 lo. 97 c.
Burlington & Western R. R. 3 g. 15 m. 38 c.
W. B. Jones, *Supt*....Burlington, Ia.
Burlington & Ohio River R. R. 4-8½ g.
R. Tanner, *Pur. Agt*....Chicago, Ill.

C

California Northern R. R. 4-8½ g. 26 m. 2 lo. 17 c.
Andrew J. Binney, *Gen. Man*..Marysville, Cal.
California Southern R. R. 4-8½ g. 127 m. 13 lo. 301 c.
J. N. Victor, *Supt*....National City, Cal.
Mech. Supt..National City, Cal.
Cambridge & Seaford. (*See Penna. R. R.; (4) Div.*)
Camden & Atlantic R. R. (*See Penna. R. R.; (2) Div.*)
Canada Southern Ry. (*See Mich. Cen.; (2) Div.*)
Canada & Atlantic Ry. 4-8½ g. 80 m.
D. C. Linsley, *Man*....Ottawa, Ont.
Canadian Pacific R. R. 4-8½ g. 1,742 m. 118 l. 2,726 c.
W. C. Van Horne, *Gen. Man*....Montreal, Que.
W. R. Baker, *Asst. Gen. Man*..Winnipeg, Man.
K. Blackwell, *Mech. Supt*....Montreal, Que.
T. W. Shaughnessy, *Pur. Agt*...Montreal, Que.
E. Div.: Archer Baker, *Gen. Supt.* Montreal, Can.
Tho. Irwin, *Mech. Supt*....Brockville, Ont.
W. Div.: J. M. Egan, *Gen. Supt*..Winnipeg, Man.
F. C. Butterfield, *M. M. & M. C. B.* Winnipeg, Man.
Cape F'r & Yadkin Val. R. R. 4-8½ g. 47 m. 4 lo. 44 c.
J. S. Morrison, *Gen. Supt*....Fayetteville, N. C.
Isaac W. Clark, *M. M. & C. B*..Fayetteville, N. C.
Cape Girardeau Southwestern Ry.
4-8½ g. 33 m. 3 lo. 20 cars.
Louis Houck, *Gen. Man*..Cape Girardeau, Mo.
W. A. Penney, *Gen. Supt*..Cape Girardeau, Mo.
W. H. Wheeler, *Pur. Agt.* Cape Girardeau, Mo.
Fred Glover, *M. M*....Cape Girardeau, Mo.
Carolina Central R. R. (*See Ral. & Aug.*)
Carson & Colorado R. R. (*See Va. & Truckee*).
Catasauqua & Fogelsville. 4-8½ g. 25 m. 6 lo. 581 c.
C. W. Chapman, *Supt. & P. A.* Catasauqua, Pa.
J. Thomas, *M. M*....Hokendauqua, Pa.
Chas. J. Holbach, *M. C. B*....Catasauqua, Pa.
Catskill Mountain R. R. 3 g. 15 m. 2 lo. 26 cars.
Charles A. Beach, *Supt*....Catskill, N. Y.
Cazenovia, Canastota & De Ruyter. (*See U., I. & E.*)
Central and South-Western Railroads (Ga.).
5 g. 1,115 m. 145 lo. 2,008 cars.
W. G. Raoul, *Pres*....Savannah, Ga.
Wm. Rogers, *Gen. Supt*....Savannah, Ga.
C. H. Carson, *Pur. Agt*....Savannah, Ga.
Cen. Div.: D. D. Arden, *M. M*....Savannah, Ga.
T. F. Warwick, *M. M*....Augusta, Ga.
F. Devine, *M. C. B*....Savannah, Ga.
So.-West'n Div.: T. D. Kline, *Supt*....Macon, Ga.
D. M. Gugel, *M. M*....Macon, Ga.
James A. Knight, *M. C. B*....Macon, Ga.
Central R. R. of N. J. (*See Phil. & Read.; N. J. Cen. Div.*)
Central R. R. of S. C. (*See Wil. & Wel.*)
Central American & Pacific Ry. 3 g. 67 m. 1 lo. 11 c.
W. C. Fitzsimmons, *Gen. Supt*..Escuintla, Guat.
Central Branch Union Pac. (*See Mo. Pac.; (3) Div.*
Central Iowa Ry. 4-8½ g. 412 m. 50 lo. 1,959 cars.
C. E. Dudley, *Gen. Supt*....Marshalltown, Ia.
D. P. Phelps, *Asst. Gen. Sup*..Marshalltown, Ia.
W. R. Coppock, *Asst. Pur. Agt.* Marshalltown, Ia.
John Player, *M. M*....Marshalltown, Ia.
T. L. Seevers, *M. C. B*....Marshalltown, Ia.
Central Ontario Ry. 4-8½ g. 33 m. 4 lo. 66 cars.
G. W. McMullen, *Gen. Man*....Picton, Ont.
James Falconar, *M. M*....Trenton, Ont.
Central Pac. R. R. 4-8½ g. 4,303 m. 382 lo. 11,260 c.
A. N. Towne, *Gen. Man*....San Francisco, Cal
J. A. Fillmore, *Gen. Supt*...San Francisco, Cal.
R. H. Pratt, *A. G. Supt*....San Francisco, Cal.
J. R. Watson, *Gen. Pur. Agt*..Sacramento, Cal.
A. J. Stevens, *Gen. M. M*....Sacramento, Cal.
W. McKenzie, *Asst. G. M. M*..Sacramento, Cal.
Benj. Welch, *Gen. M. C. B*....Sacramento, Cal.
G. J. Turner, *Asst. G. M. C. B.* Sacramento, Cal.
Western: Visalia & Tulare Divs. and Northern Ry.
A. D. Wilder, *Supt*....W. Oakland, Cal.
G. D. Welch, *M. M.* (W. Div.). W. Oakland, Cal.
W. B. Ludlow, *M. C. B.* (W. Div.) do.
S. Johnson, *M. M.* (T. Div.)....Tulare, Cal.
D. Rutherford, *M. M.* (N. Rd.). S. Vallejo, Cal.
Sacramento: Oregon Divs.; and Cal. Pac. R. R.
J. B. Wright, *Supt*....Sacramento, Cal.
M. W. Cooley, *M. M.* (*S. Div.*) Sacramento, Cal.
Truckee Div.: J. H. Whited, *Supt.* Wadsworth, Nev.
Geo. Gregg, *M. M*....Wadsworth, Nev.
Wm. McPherson, *F. Car Sh*..Wadsworth, Nev.
Humb't Div.: G. W. Coddington, *Supt.* Carlin, Nev.
W. F. Smith, *M. M*....Carlin, Nev.
J. C. Doughty, *For. Car Sh*....Carlin, Nev.
Salt Lake Div.: A. G. Fell, *Supt*....Ogden, Utah.
James Lamb, *M. M*....Terrace, Utah.
A. Sherburne, *For. Car Sh*....Ogden, Utah.
Colorado Div.: C. B. Seymour, *Supt.* Needles, Cal.
St. & Cop. R. R.: R. L. Myrick, *Supt*..Stockton, Cal.
Los Angeles; and Yuma Divs. (So. Pac.):
E. E. Hewitt, *Asst. Supt*....Los Angeles, Cal.
James Velsir, *M. M*....Los Angeles, Cal.
T. T. Gilleland, *For. Car Sh.* Los Angeles, Cal.
Arizona Divs. (So. Pac.):
A. A. Bean, *Asst. Supt*....Tucson, Ariz.
W. F. Smith, *M. M*....Tucson, Ariz.
Rio Grande (S. Pac.) & El Paso (G. H. & S. A.) Divs.:
J. Campbell, *Supt*....El Paso, Texas.
J. L. Bonner, *M. M*....El Paso, Texas.
H. C. Standish, *For. Sh*....El Paso, Texas.
Galveston, Harrisburg & San Antonio Ry.
E. G. Thompson, *Supt*....Houston, Tex.
San Anto. Div.: W. G. Van Vleck, *Supt.*, and
J. J. Ryan, *M. M*....San Antonio, Tex.
Houston Div.: H. Flanders, *Supt*..Harrisburg, Tex.
D. T. Davis, *M. M*....Harrisburg, Tex.
Louisiana Div.: W. Irwin, *Supt*....Houston, Tex.
D. C. Smith, *M. M*....Houston, Tex.
J. M. Mather, *M. C. B*....Houston, Tex.
El Paso Div.: Jas. Campbell, *Supt*..El Paso, Tex.
J. L. Bonner, *M. M*....El Paso, Tex.
Central Texas & N'w'n R. R. (*See Hous. & Tex. Cen.*)
Central Vermont R. R. 4-8½ g. 673 m. 136 lo. 2,789 c.
J. W. Hobart, *Gen. Man*....St. Albans, Vt.
J. M. Foss, *Asst. Gen. Supt. & M. M.* St. Albans, Vt
No. Div.: I. B. Futvoye, *Supt*....St. Johns, P. Q.
Rut. Div.: J. Burdett, *Supt*....Rutland, Vt.
N. L. Davis, *M. M. & C. B*....Rutland, Vt.
Brattleboro & Whitehall R. R., and
Brat. Div.: E. F. Brooks, *Supt*...Brattleboro, Vt.
New London No'n R. R. 143 m. 22 lo. 303 c.
C. F. Spaulding, *G. Supt. & P. A.* New London, Ct.
I. W. Dow, *M. M*....New London, Ct.
S. O. Banks, *M. C. B*....New London, Ct.
Chagrin Falls & Southern R. R. 3 g. 6 m. 1 lo. 12 c.
W. Hutchings, *Gen. Man*....Chagrin Falls, O.
J. W. Williams, *Gen. Supt*....Chagrin Falls, O.
Charleston & Savannah Ry. 5 g. 115 m. 17 lo. 108 c.
H. S. Haines, *Gen. Man*....Savannah, Ga.
C. S. Gadsden, *Gen. Supt*....Charleston, S. C.
H. A. Ulmo, *M. M*....Savannah, Ga
Charlotte, Columbia & Augusta R. R. (*See Rich. & D.*)
Chateaugay R. R. 3 g. 34 m. 6 lo. 312 cars.
A. L. Inman, *Gen. Man*....Plattsburg, N. Y.
F. N. Corbin, *Supt*....Plattsburg, N. Y.
J. M. Davis, *M. M*....Plattsburg, N. Y.
Chattaroi Ry. 4-8½ g. 51 miles 11 loco. 483 cars.
C. H. Rockwell, *Gen. Man. & P. A.* Ashland, Ky.
J. R. Martin, *M. M*....Ashland, Ky.
Joseph P. Burleigh, *M. C. B*....Ashland, Ky.
Cheraw & Chester R. R. (*See Rich. & Dan.; (2) Div.*)
Cheraw & Darlington R. R. (*See Wil. & Wel.*)
Cheraw & Salisbury R. R. (*See Wil. & Wel.*)
Cherokee R. R. (*See East & West.*)
Cherry Valley R. R. 4-8½ g. 6 m. 3 lo. 6 cars.
E. T. Herndon, *Supt*....Midland, Mo.
Chesapeake, Ohio & South-Western.
4-9 g. 398 m. 47 lo. 1,339 c.
D. W. C. Brown, *Gen. Supt*....Louisville, Ky.
H. E. Huntington, *Pur. Agt*....Louisville, Ky.
J. E. Reeves, *Mast. Trans*....Louisville, Ky.
R. H. Briggs, *Supt. M. P*....Elizabethtown, Ky.
D. L. Weaver, *M. M*....Elizabethtown, Ky.
Chas. Daniels, *M. M*....Paducah, Ky.
Chesapeake & Ohio Ry. 4-8½ g. 642 m. 169 l. 5,120 c.
C. W. Smith, *Gen. Man*....Richmond, Va.
D. A. Sweet, *Asst. to Gen. Man.* Richmond, Va.
A. H. Wood, *Asst. Gen. Supt.*, Huntington, W. Va.
A. S. Emmons, *Pur. Agt*....Richmond, Va.
T. L. Chapman, *Supt. M. P*....Richmond, Va.
Eastern Div.: A. H. Wood, *Supt*..Richmond, Va.
J. N. King, *M. C. B*....Richmond, Va.
Hunt. Div.: W. B. Ryder, *Supt*...Hinton, W. Va.
W. H. Thomas, *M. M*..Huntington, W. Va.
H. C. Bassinger, *M. C. B.* Huntington, W. Va.
Lex. Div.: J. D. Yarrington, *Supt*..Lexington, Ky.
S. R. Tuggle, *M. M*....Lexington, Ky.
Cheshire R. R. 4-8½ g. 80 m. 30 lo. 522 cars.
R. Stewart, *Gen. Man*....Keene, N. H.
H. H. Stone, *Pur. Agt*....Keene, N. H.
F. A. Perry, *M. M*....Keene, N. H.
A. E. Howard, *M. C. B*....Keene, N. H.
Chester & Lenoir Ry. (*See Rich. & Dan.; (3) Div.*)
Chicago, Bur. & Kan. City Ry. (*See C. B. & Q.*)
Chicago, Burlington & Quincy R. R.
4-8½ g. 3,608 m. 545 lo. 21,012 cars.
T. J. Potter, *Gen. Man*....Chicago, Ill.
(1) C., B. & Q., East of Mo. Riv.
H. B. Stone, *Asst. Gen. Man*....Chicago, Ill.
Wm. Irving, *Gen. Pur. Agt*....Chicago, Ill.
G. W. Rhodes, *Supt. M. P*....Aurora, Ill.
Wm. Forsyth, *Mech. Eng*....Aurora, Ill.
Ill. Divs.: J. D. Besler, *Supt*....Galesburg, Ill.
Chi. Div.: Geo. Alexander, *Supt*....Aurora, Ill.
L. E. Johnson, *M. M*....Aurora, Ill.
Galesburg Div.: F. C. Rice, *Supt.* Galesburg, Ill.
Robert Colville, *M. M*....Galesburg, Ill.
St. L. Div.: S. E. Crance, *Supt*..Beardstown, Ill.
A. Forsyth, *M. M*....Beardstown, Ill.
Ia. & Mo. Divs.: W. F. Merrill, *Supt.* Burlington, Ia.
East. Div.: O. E. Stewart, *Supt*..Burlington, Ia.
Joel West, *M. M*....Burlington, Ia.
Mid. Div.: J. B. Maxon, *Supt*....Ottumwa, Ia.
West'n Div.: W. B. Ryder, *Supt*....Creston, Ia.
C. W. Eckerson, *M. M*....Creston, Ia.
Chi., B. & Kan. C'y and St. L., Keo. & No.-W'n Rys.
Robt. Law, *Gen. Supt*....Keokuk, Ia.
W. H. Bartlett, *M. M*....Burlington, Ia.
(2) C. B. & Q., West of Mo. Riv.
G. W. Holdrege, *Asst. Gen. Man.* Omaha, Neb.
C. M. Wead, *Supply Agt*....Omaha, Neb.
D. Hawksworth, *M. M*....Plattsmouth, Neb.
Bur. & Mo. Riv. & Neb. Ry. Divs.:
T. E. Calvert, *Gen Supt*....Lincoln, Neb.
D. E. Thompson, *Supt*....Lincoln, Neb.
E. Bignell, *M. M*....Lincoln, Neb.
R. V. Div.: A. Campbell, *Supt*....McCook, Neb.
A. & N. Div.: J. McConniff, *Supt*..Lincoln, Neb.
Chicago, Milwaukee & St. Paul R. R.
4-8½ g. 4,528 m. 626 lo. 19,018 cars.
S. S. Merrill, *Gen. Man*....Milwaukee, Wis.
J. T. Clark, *Gen. Supt*....Milwaukee, Wis.
J. T. Crocker, *Pur. Agt*....Milwaukee, Wis.
J. M. Lowry, *Gen. M. M*....Milwaukee, Wis.
E. Fairbairn, *M. M*....Milwaukee, Wis.
John Bailie, *Supt. Car Dept*...Milwaukee, Wis.
(1) H. C. Atkins, *Asst. Gen. Supt*..Milwaukee, Wis.
Chi. Div.: Geo. O. Clinton, *Supt*....Chicago, Ill.
La Crosse Div.: W. G. Collins, *Supt.* Milwaukee, Wis.
C. Bluffs Div.: A. J. Earling, *Supt*....Marion, Ia.
P. du C. & M. Pt. Divs.:
R. B. Campbell, *Supt*....Milwaukee, Wis
(2) C. H. Prior, *Asst. Gen. Supt*..Minneapolis, Minn.
H. & D. Div.: M. W. Kellie, *Supt.* do.
J. O. Pattie, *M. M*....Minneapolis, Minn.
Ia. & Minn. Div.: H. R. Williams, *Supt.* do.
S. Minn. Div.: F. D. Underwood, *Supt.* Lacrosse, Wis.
Riv. & Dub. Divs.: C. W. Case, *Supt.* Dubuque, Ia.
S. Charnley, *M. M*....Dubuque, Ia.
Ia. & Da. Div.: G. W. Sanborn, *Supt.* Mason City, Ia
S. Cy. & Da. Div.: J. Jackson, *Supt.* Sioux City, Ia.
F. H. Moulton, *M. M*....Yankton, Dak.
(3) D. A. Olin, *Asst. Gen. Supt*....Racine, Wis
So.-Wn. Divs.: D. L. Bush, *Supt*....Racine, Wis
John Taylor, *M. M*....Racine, Wis.
E. A. Eddy, *M. C. B*....Racine, Wis.
(4) Northern Div.: L. B. Rock, *Supt.* Milwaukee, Wis.
Wm. E. Kittredge, *M. C. B*..Milwaukee, Wis.
Chicago, Pekin & So-Wn. R. R. 4-8½ g. 88 m. 11 lo. 471 c.
A. H. Crocker, *Rec*....Joliet, Ill.
J. N. Chilson, *M. C. B*....Streator, Ill
Chicago, Rock Island & Pac. Ry.
4-8½ g. 1,381 m. 309 lo. 8,367 cars.
R. R. Cable, *V. P. & Gen. Man*....Chicago, Ill.
A. Kimball, *Gen. Supt*....Chicago, Ill.
H. F. Royce, *Asst. G. Supt*....Davenport, Ia.
F. A. Marsh, *Pur. Agt*....Chicago, Ill.
T. B. Twombly, *Gen. M. M*....Chicago, Ill.
B. K. Verbryck, *Gen. M. C. B*....Chicago, Ill.
Ill. Div.: R. H. Chamberlin, *Supt*....Chicago, Ill.
R. Biester, *M. M*....Chicago, Ill.
Sam'l Pullman, *M. C. B*....Chicago, Ill.
Ia. Divs.: Jno. Given, *Supt*....Des Moines, Ia.
J. G. Crockett, *M. M*....Stuart, Ia.
Jas. E. Morrill, *M. M*....Davenport, Ia.
Chas. M. Leonard, *M. C. B*....Davenport, Ia.
K. & Des. M. Div.: Jno. Given, *Supt*..DesMoines, Ia.
S. W. Wakefield, *M. M*....Keokuk, Ia.
Henry Kummer, *M. C. B*....Keokuk, Ia.
So.-Wn. Div.: G. F. Walker, *Supt*....Trenton, Mo.
R. O. Carscadin, *M. M*....Trenton, Mo.
Chas. R. Best, *M. C. B*....Trenton, Mo.
Chicago, Saginaw & Canada R. R. (*See Det., L. & N.*)
Chicago, St. Louis & New Orleans R. R. (*See Ill. Cen.*)
Chicago, St. Louis & Pittsburg R. R.
4-9 g. 635 m. 202 lo. 3,510 cars.
James McCrea, *Manager*....Columbus, O.
Wm. Mullins, *Gen. Pur. Agt*....Pittsburg, Pa.
Edward B. Wall, *Supt. M. P*....Columbus, O.
1, 3 & 5 Divs.: J. F. Miller, *Supt.* Richmond, Ind.
Robert Curtis, *M. M*....Columbus, O.
J. L. Copeland, *G. F. Car Shops.* Columbus, O.
W. C. Arp, *Gen. For*....Indianapolis, Ind.
2 & 4 Divs.: Chas. Watts, *Supt.* Logansport, Ind.
W. W. Reynolds, *M. M*....Logansport, Ind.
Chas. H. Starr, *G. F. C. Shops*, Logansport, Ind.
Chicago, St. Paul, Minneapolis & Omaha Ry.
4-8½ g. 1,256 m. 181 lo. 5,221 cars.
J. M. Whitman, *Gen. Supt*....St. Paul, Minn.
W. H. S. Wright, *Pur. Agt*....St. Paul, Minn.
Matt. Ellis, *M. M*....St. Paul, Minn.
H. L. Preston, *M. C. B*....Hudson, Wis.
Ea. & No. Div.: A. A. Hobart, *Supt.* St. Paul, Minn.
St. Paul and Sioux City Div.:
H. Spencer, *Supt*....St. James, Minn.
H. C. Anderson, *Gen. For. Sh*....Sioux Cy, Ia.
Neb. Div.: Geo. V. Morford, *Supt*....Omaha, Neb.
Chic., Tex. & Mexican Cent. Ry. (*See Gulf, C. & S. F.*)
Chicago & Alton R. R. 4-8½ g. 849 m. 213 lo. 6,168 c.
C. H. Chappell, *Gen. Man*....Chicago, Ill.
W. F. Merrill, *Gen. Supt*....Chicago, Ill.
A. V. Hartwell, *Pur. Agt*....Chicago, Ill.
Wm. Wilson, *Supt. of Mach*...Bloomington, Ill.
Jos. Townsend, *G. For. Car Dept.* do.
Chi. Div.: A. M. Richards, *Supt.* Bloomington, Ill.
St. Louis Div.: S. D. Reeves, *Supt*..Roodhouse, Ill.
Wm. McPhail, *M. M*....Slater, Mo.
Chicago & Atlantic Ry. 4-8½ g. 269 m.
Gen. Man....Chicago, Ill.
J. C. Williams, *Gen. Supt*....Chicago, Ill.
J. F. McPherson, *Pur. Agt*....Chicago, Ill.
Geo. A. Hill, *M. M. & M. C. B*....Chicago, Ill.
West. Div.: J. H. Parsons, *Supt*....Chicago, Ill.
East. Div.: J. H. Tinney, *Supt*..Huntington, Ind.
Chi. & East'n Ill. 4-8½ g. 252 m. 56 lo. 3,500 cars.
O. S. Lyford, *Gen. Supt*....Chicago, Ill.
D. R. Patterson, *Pur. Agt*....Chicago, Ill.
P. W. Drew, *M. Trans*....Chicago, Ill.
Allen Cooke, *M. M*....Danville, Ill.
Chicago & Grand Trunk Ry. (*See Grand Trunk.*)
Chicago & Great Southern Ry.
4-8½ g. 124 m. 4 lo. 122 c.
Henry Crawford, *Gen. Man*....Chicago, Ill.
H. Crawford, Jr., *Supt*....Chicago, Ill.
Chicago & Iowa R. R. 4-8½ g. 104 m. 16 lo. 237 cars.
T. J. Potter, *Gen. Man*....Chicago, Ill.
W. H. Holcomb, *Gen. Supt*....Rochelle, Ill.
H. S. Bryan, *M. M*....Aurora, Ill.
Chicago & Northwestern Ry.
4-8½ g. 3,610 m. 558 lo. 18,685 cars.
Marvin Hughitt, *2d V. Prs. & G. M.* Chicago, Ill.
C. C. Wheeler, *Gen. Supt*....Chicago, Ill.
W. B. Linsley, *Ass't Gen. Supt*....Chicago, Ill.
R. W. Hamer, *Pur. Agt*....Chicago, Ill.
Geo. W. Tilton, *Supt. M. P. & M.*; and
A. Supt. M. P. & M....Chicago, Ill.
Wis. and Mil. Divs. & Sheboygan & W'n Ry.:
Ed. J. Cuyler, *Supt*....Chicago, Ill.
Gal. Div.: Chas. Murray, *Supt*....Chicago, Ill.
Pen'a Div.: W. F. Fitch, *Supt*....Escanaba, Mich.
J. Symons, *M. M*....Escanaba, Mich.
Mad. Div.: C. A. Swineford, *Supt*..Baraboo, Wis.
Minn. & Dak. Divs.: S. Sanborn, *Asst. Gen. Supt.*
and W. A. Scott, *M. M*....Winona, Minn.
Dak. Cen. Ry.: J. S. Oliver, *Supt*....Huron, Dak.
Ia. Div.: H. G. Burt, *Supt*....Boone, Ia.
Geo. W. Lowe, *M. M. & M. C. B.* Clinton, Ia.
No. Ia. Div.: M. Hopkins, *Supt*...Eagle Grove, Ia.
Win. & St. P. Div.: W. P. Cosgrave, *Supt.*
Chicago & West Michigan:
4-8½ g. 409 m. 43 lo. 1,345 cars.
Geo. C. Kimball, *V. P. & G. Man.* Muskegon, Mich.
A. M. Nichols, *Gen. Supt*....Gd. Rapids, Mich.
Edw. Hill, *Pur. Agt*....Muskegon, Mich.
W. F. N. Davis, *M. M*....Muskegon, Mich.
Chicago & West'n Ind. R. R. 4-8½ g. 51 m. 12 lo. 150 c.
James Walsh, *Gen. Man*....Chicago, Ill.
Cincinnati, Columbus & Hocking Val. Ry.
4-9 g. 25 m. 2 lo. 77 cars.
D. P. Hyatt, *Gen Man*....Dayton, O.
Cin., Georgetown & Portsmouth. 3 g. 35 m. 3 lo. 45 c.
M. Simmons, *Supt*....Cincinnati, O.
J. C. Homer, *M. M*....Cincinnati, O.
Cincinnati & Green River Ry. 3 g. 11 m. 2 lo. 41 c.
G. B. Harper, *Supt*....Grove, Ky.
Geo. Lewis, *M. M*....Grove, Ky.
Cin., Hamilton & Dayton R. R. 4-9 g. 352 m. 92 l. 2,932 c.
C. J. Hepburn, *Gen. Supt*....Cincinnati, O.
P. Hickey, *Pur. Agt*....Cincinnati, O.
John Black, *Gen. M. M*....Lima, O.
W. H. H. Allison, *M. C. B*....Cincinnati, O.
Day. & Mich. Div.: W. F. Stark, *Supt*..Toledo, O.
C. R. & C. Div.: W. S. Brewer, *M. M.* Richm'd, Ind.
Cincinnati, Indianapolis, St. Louis & Chicago Ry.
4-8½ g. 384 m. 71 lo. 3,279 cars.
J. W. Sherwood, *Supt*....Indianapolis, Ind.
Geo. Tozzer, *Pur. Agt*....Cincinnati, O.
J. S. Patterson, *M. of Mach. & M. C. B.* Cincinn., O.
Cincinnati, New Orleans & Texas Pacific Ry. Co.
5 g. 846 m. 123 lo. 3,464 cars.
John Scott, *Gen. Man*....Cincinnati, O.
Richard Carroll, *Gen. Supt*....Cincinnati, O.
R. W. Healey, *Gen. Pur. Agt*....Cincinnati, O.
James Meehan, *S. M. P. & M*....Cincinnati, O.
Cin. So. Div.: W. W. Wells, *Supt*..Somerset, Ky.
I. W. Fowle, *M. M*....Cincinnati, O.
John Richardson, *M. C. B*....Cincinnati, O.
A. Thomson, *M. M*....Chattanooga, Tenn.
Ala. Gr. S'n Div.: C. B. Wallace, *Supt.*, and
George Manuell, *M. M*....Chattanooga, Tenn
Fred Morgan, *M. C. B*....Chattanooga, Tenn
V. & M. Div.: E. F. Raworth, *Supt.*, and
James B. Browne, *M. M*....Vicksburg, Miss.
V. S. & P. Div.: F. Y. Dabney, *Supt.* Monroe, La.
W. Bell Smith, *M. M. & C. B*....Monroe, La.
New Orleans & North-Eastern R. R.
T. S. Williams, *Supt*....New Orleans, La.
Cincinnati Northern Ry. (*See Tol., Cin. & St. L.*

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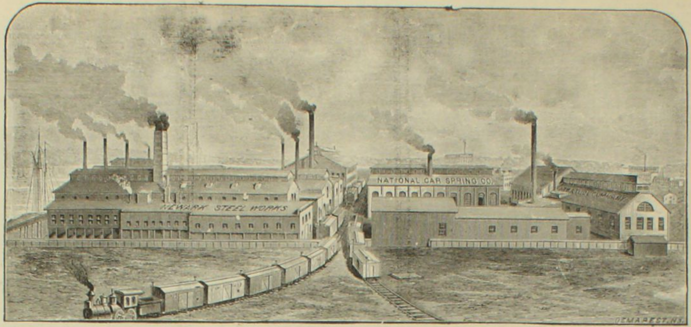
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OFFICE, 13 BARCLAY STREET, NEW YORK.

HOPKINS VERSUS LE ROY!

THE QUESTION.

Does the Le Roy Journal Bearing Company "stand ready" to make what are commonly known as Hopkins Journal Bearings, because of numerous disgusting failures, resulting from the use of the weak, gridiron arrangement known as the Le Roy Bearing heretofore made and sold by them, and the consequent necessity of going out of business or giving their customers a really good bearing even if they have to "pirate" the invention for which a patent was granted to Hopkins that has been declared valid by both the Eastern and Western Railroad Association?

Does the Le Roy Company expect to build up a business by infringing Hopkins' Patent, and selling bearings, and a lawsuit with them?

In the recent interference patent fight between Hopkins and Le Roy, the Commissioner of Patents, in his final decision, which was rendered August 31, 1883, says:

"On the broad claim, as well as the specific claim covering the device embodying not only the broad but the specific invention of a journal bearing with a soft metal lining, with ridges or projections so arranged that, upon being brought in contact with the axle, the ridges or projections will yield and spread out so as to make a perfectly-fitting box, priority of invention must be awarded to Hopkins."

As to the specific arrangement for which priority of invention was awarded to Le Roy, all will perceive that the broad claim for which priority of invention is awarded to Hopkins, and the very broad claim embodied in the patent granted him Oct. 16, 1883, in the following words: "A Journal Bearing made of two different metals, one of soft or yielding nature, and the other of a hard or unyielding nature, the soft or yielding carrying ridges or spurs which receive the initial pressure of the journal, and by the rolling action of the same and the load pressure upon the bearing becomes crushed down and spread in conformity with the contour thereof, as described, whereby the surfaces in wearing contact are adjusted to each other, substantially as specified,"

COVERS THE WHOLE CASE

AN OLD ADAGE SAYS:
"SUE A BEGGAR AND CATCH A LOUSE."

Will Mr. McLean, of the so-called Le Roy Journal Bearing Co., give to Mr. Hopkins and to Railroad Companies and Car-Builders any reliable proof that his Company is in reality anything else than an irresponsible piratical concern (see his advertisement) that is absolutely judgment proof, and any guarantees it may offer against suits by Hopkins are not perfectly worthless, and in so doing will he talk plain, honest common sense, instead of craftily stringing together a lot of words (see his advertisement) that mean nothing unless they mislead?

No invention ever did or can infringe any patent. It is not the invention in any case that infringes, but the making, selling or using of a thing patented without the right to do so. Talk about making an offer to settle a point that does not exist is as cheap as it is misleading and worthless.

As to his being the prior inventor of Bearings with soft metal ridges for receiving the Initial pressure of the Journal, and leaves him absolute master of the situation.

All parties are hereby warned that my rights under said Letters Patent will be enforced.

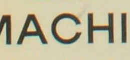
D. A. HOPKINS, Patentee and Manufacturer,

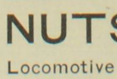
113 Liberty Street, - - - - New York.

Rhode Island Tool Company,

MANUFACTURERS OF

COLD PUNCHED, SQUARE AND HEXAGON





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Cincinnati, Selma & Mobile R.R. 5 g. 71 m. 6 lo. 148 c.
D. McLaren, *Spt*......Selma, Ala.
H. L. Wright, *Pur. Agt*......Selma, Ala.
J. M. Levis, *M. M*......Marion, Ala.
Cincinnati, Van Wert & Michigan R. R.
4-9 g. 39 m. 4 lo. 64 cars.
E. C. Dawes, *Gen. Supt*......Cincinnati, O.
Cin., Wabash & Mich. Ry. 4-8½ g. 165 m. 13 lo. 402 c.
Norman Beckley, *Gen. Man. & P. A.* Elkhart, Ind.
O. W. Lamport, *Supt*......Wabash, Ind.
S. B. Tinker, *M. M. & M. C. B*......Wabash, Ind
Cin., Wash. & Balt. 4-8½ g. 312 m. 65 lo. 1,422 cars
Jas. H. Stewart, *Gen. Man*......Cincinnati, O.
Edw. Evans, *M. M*......Chillicothe, O.
T. G. Duncan, *Supt. Car Dept*......Zaleski, O.
Cincinnati, Wheeling & New York R.R. 4-8½ g. 13 m.
Thos. R. Sharp, *Pres*......New York, N. Y.
Cincinnati & Eastern Ry. 3 g. 100 m. 7 lo. 133 cars.
S. Woodward, *Gen. Man*......Cincinnati, O.
G. H. Wilber, *Gen. Sup. & Pur. Agt*. Cincinnati, O.
P. W. Naughton, *M. M*......Newtown, O.
Cincinnati & South-Eastern Ry. 4-8½ g. 18 m.
John V. Patton, *Gen. Man*......Newport, Ky.
Clarksburg, Weston & Glenville R. R.
3 g. 26 m. 3 lo. 45 cars.
A. H. Kunst, *Pres. & Gen. Man*. Weston, W. Va.
Sam. A. Steel, *M. M*......Weston, W. Va.
F. Dillie, *M. C. B*......Nottingham, O.
Cleveland, Columbus, Cincinnati & Indiana and Indianapolis & St. Louis Rys. and Dayton & Union R. R. 4-8½ g. 785 m. 246 lo. 7,988 cars.
E. B. Thomas, *Gen. Man*......Cleveland, O.
J. L. Yale, *Pur. Agt*......Cleveland, O.
W. F. Turreff, *Gen. M. M*......Cleveland, O.
Col. & Cin. Div.: Robt. Blee, *Supt*. Cleveland, O.
W. L. Gilmore, *M. M*......Cleveland, O.
A. G. Steinbrenner, *G. For. Car Dept.* do.
, *Div. M. M*......Delaware, O.
Ind'p'lis Div.: John O. Ewan, *Supt*. Ind'polis, Ind
J. K. Lape, *M. M*......Brightwood, Ind.
N. Mark, *G. For. Car Dept*. Brightwood, Ind.
Ind. & St L Ry.: Tho. Burrows, *Supt*. St. Louis, Mo.
T. W. Ranson, *M. M. & C. B*......Mattoon, Ill.
Day. & Un. Rd.: J. H. Barrett, *Supt*. Cincinnati, O
H. S. Gordon, *For. M. Shops*......Dayton, O.
Cleveland, Delphos & St. Louis R. R.
3 g. 46 m. 2 lo. 44 cars.
I. H. Burgoon, *Gen. Man*......Delphos, O.
B. F. Marshall, *M. M*......Delphos, O.
Cleveland, Indiana & St. Louis R. R.
4-8½ g. 19 m. 2 lo. 20 cars.
J. A. Larned, *Rec. & Supt*......Anderson, Ind.
Cleveland, Mt. Vernon & Delaware R. R.
4-9 g. 144 m. 22 lo. 751 c.
N. Monsarrat, *Gen Supt*......Akron, O.
G. M. Taylor, *M. M. & C. B*......Mt. Vernon, O.
Cleve., Youngstown & Pitts. R. R. 3 g. 30 m. 3 lo. 138 c.
D. T. Lumley, *Gen. Supt*......Alliance, O.
C. H. Dorman, *M. M. & M. C. B*......Alliance, O.
Cleveland, Lorain & Wheeling Ry.
4-8½ g. 158 m. 31 lo. 1,878 cars.
Oscar Townsend, *Gen. Man*......Cleveland, O.
Wm. Thornburg, *Supt*......Lorain, O.
W. A. Stone, *M. M*......Lorain, O.
Cleve. & Marietta R. R. (*See Wheel. & Lake Erie.*)
Cleveland & Pittsburg. (*See Penna. Co.*; (4) *Div.*)
Clifton & Lordsburg Ry. 20 m.
W. H. Jones, *Gen. Supt. & Pur. Agt*. Lordsb'g N. M.
Clifton & Port Hudson R. R. 4-8½ g. 21 m. 3 lo. 12 c.
C. Corcoran, *Supt*......Clinton, La.
Ried Blochman, *M. M*......Clinton, La.
Clove Branch R. R. 4-8½ g. 4 m. 1 lo. 59 cars.
C. L. Kimball, *Supt*......Mattewan, N. Y.
W. G. Vanbuskirk, *M. M*...Dutchess Jc., N. Y.
Coburg, Peterborough & Marmora Ry.
5-6 g. 47 m. 5 lo. 255 cars.
Jas. R. Barber, *Gen. Supt*......Cobourg, Ont.
Jas. Clark, *M. M*......Cobourg, Ont
John Tinney, *M. C. B*......Cobourg, Ont.
Colorado Central R. R. (*See Un. Pac.*; (4) *Div.*)
Columbia & Greenville R. R. (*See Rich. & D.*; (3) *Div.*)
Columbia & Puget Sound R.R. 3 g. 21 m. 7 lo. 114 c.
J. M. Colman, *Gen. Supt*. Seattle, Wash. Ter.
Columbus, Hocking Valley & Toledo Ry.
4-9 g. 324 m. 90 lo. 7,257 cars.
G. R. Carr, *Gen. Supt*......Columbus, O.
W. M. Greene, *Pur. Agt*......Columbus, O.
Ira G. Hutchins, *M. M*......Columbus, O.
J. M. Rockafield, *M. C. B*......Columbus, O.
Tol. Div.: M. T. Seymour, *Supt*......Columbus, O.
Hock. V. Div.: M. P. L. Booth, *Supt*. Columbus, O.
Ohio Riv. Div.: C. D. Norris, *Supt*......Logan, O.
Columbus & Eastern R. R. In progress
J. E. Redfield, *Pres*......Columbus, Ohio.
Columbus & Maysville Ry. (*See Cin. & East.*)
Columbus & Rome R. R. 3 g. 33 m. 2 lo. 30 cars.
M. E. Gray, *Supt*......Columbus, Ga.
Columbus & Western Ry. 5 g. 89 m. 2 lo. 53 cars
E. A. Flewellen, *Gen. Man*......Columbus, Ga.
R. A. Bridges, *M. M*......Opelika, Ala.
Concord R. R. 4-8½ g. 141 m. 38 lo. 1,235 cars.
H. E. Chamberlain, *Supt. & P. Agt*. Concord, N. H.
J. T. Gordon, *M. M. & C. B*......Concord, N. H.
Concord & Claremont R. R. (*See Northern of N. H.*
Conn. Riv. and Ver. Val. R. Rs. 4-8½ g. 130 m. 42 lo. 554 c.
J. Mulligan, *Supt. & Pur. Agt*. Springfield, Mass.
W. H. Stearns, *M. M*......Springfield, Mass.
Robert Hitchcock, *M. C. B*...Springfield, Mass.
Conn. & Passumpsic Rivers R. R. (*See Passumpsic.*)
Connotton Valley R. R. 3 g. 160 m. 26 lo. 997 cars.
Samuel Briggs, *Gen. Man*......Cleveland, O.
B. C. Bosworth, *M. M*......Canton, O.
Cooperstown & Susquehanna Valley R. R.
4-8½ g. 16 m. 2 lo. 14 cars.
Andrew Shaw, *Pres*......Cooperstown, N. Y.
A. Mumford, *M. M*......Cooperstown, N. Y.
Corning, Cowanesque & Antrim Ry. (*See Syr., G. & C.*)
Cornwall R. R., 4-8½ g. 12 m. 5 lo. 166 cars
Frank Donahue, *G. Supt. & M. M*. Lebanon, Pa.
Levi Blonch, *M. C. B*......Lebanon, Pa.
Coudersport & Port Allegheny R. R.
3 g. 17 m. 2 lo. 50 cars.
B. A. McClure, *Gen. Supt*......Coudersport, Pa.
Credit Valley Ry. 4-8½ g. 184 m. 22 lo. 535 cars.
Wm. Whyte, *Gen. Supt*......Toronto, Ont.
John Macnab, *Pur. Agt*......Toronto, Can.
H. G. Taylor, *Mech. Supt*......Toronto, Can.
Crooked Creek R. R. 3 g. 9 m. 1 lo. 37 cars.
Walter C. Willson, *Gen. Man*. Webster City, Ia.
Geo. W. Post, *Pur. Agt*......Lehigh, Ia.
Crown Point Iron Co. R. R. 3 g. 13 m. 4 lo. 113 c.
A. L. Inman, *Gen. Man*......Plattsburg, N. Y.
H. L. Reed, *Pur. Agt*......Crown Point, N. Y.
J. M. Davies, *Supt. & M. M*. Crown Point, N. Y.
J. C. Sherman, *M. C. B*......Crown Point, N. Y.
Cumberland Ry. 4-8½ g. 32 m. 1 lo. 64 c.
J. A. Killam, *Gen. Man*......Parsboro, N. S.
K. McKinnon, *M. M*......Parsboro, N. S.
Cumberland Valley R. R. 4-9 g. 125 m. 21 lo. 451 cars.
J. F. Boyd, *Supt*......Chambersburg, Pa.
A. S. Hull, *M. M*......Chambersburg, Pa.
C. Wicke, *M. C. B*......Chambersburg, Pa.
Cumberland & Maurice River R. R. 4-8½ g. 20 m.
L. H. Dowdney, *Supt*......Port Morris, N. J.
Cumberland & Penn. R. R. 4-8½ g. 55 m. 28 lo. 625 c.
P. L. Burwell, *Gen Supt & P. A.* Cumberland, Md.
N. W. Howson, *Mast. of Mach*. Mt. Savage, Md.
Nathan Binix, *M. C. B*......Mt. Savage, Md.

D

Danville & New River R. R. 3 g. 43 m. 2 lo. 30 c.
W. T. Sutherlin, *Gen. Man*......Danville, Va.
J. F. Morton, *M. M*......Danville, Va.
Danbury & Norwalk R. R. 4-8½ g. 36 m. 7 lo. 112 c.
C. M. Crawford, *G. Supt. & P. A.* S. Norwalk, Ct.
N. M. George, *M. M. & C. B*......Danbury, Conn.
Danville, Mocksville & So.-Wn. R. R. 3 g. 28 m.
H. M. Shivler, *Supt*......Leakesville, N. C.
Danville, Olney & O. R. R.R. 4-8½ g. 110 m. 5 lo. 83 c.
Chas. Howard, *Rec. & Man*......Olney, Ill.
J. M. Graham, *Supt*......Kansas, Ill.
Louis Parisoe, *M. M. & C. B*......Kansas, Ill.
Dayton & Union R. R. (*See Clev., Col., Cin. & Ind.*)
Dayton & Michigan R. R. (*See Cin., Ham. & Day.*)
Del. Lackawanna & W. and N. Y., Lack. & W. R. Rs.
4-8½ g. 930 m. 436 lo. 31,989 cars.
Wm. F. Halstead, *Gen. Supt*......Scranton, Pa.
G. W. B. Cushing, *Pur. Agt*...New York, N. Y.
Walter Dawson, *Mast. of Mach*...Scranton, Pa.
Robt. McKenna, *M. C. B*......Scranton, Pa.
Bloomsb'g Div.: C. Graham, *M. M*. Kingston, Pa.
Utica Div.: A. C. Salisbury, *Supt*......Utica, N. Y.
Thos. Thatcher, *M. M*......Utica, N. Y.
Morris & Essex Div.; Sussex; P. & D. and C. R. Rs.
A. Reasoner, *Supt*......Hoboken, N. J.
W. H. Lewis, *M. M*......Kingsland, N. J.
J. W. Baker, *Mast. Car Rep*......Dover, N. J.
Oswego & Syracuse Div.:
W. B. Phelps, *Supt*......Oswego, N. Y.
Jas. Buchanan, *M. M*......Syracuse, N. Y.
Syracuse, Binghamton & New York R. R.
4-8½ g. 81 m. 20 lo. 598 cars.
W. K. Niver, *Gen. Supt*......Syracuse, N. Y.
Jas. Buchanan, *M. M*......Syracuse, N. Y.
Cayuga Div.: W. R. Humphrey, *Supt* Ithaca, N.Y.
Delaware, Maryland & Virginia R. R.
4-8½ g. 101 m. 7 lo. 145 cars.
Tho. Groom, *Supt*......Lewes, Del.
Geo. Messick, *M. M*......Lewes, Del.
W. H. Virden, *M. C. B*......Lewes, Del.
Delaware River R. R. 4-8½ g. 20 m. 3 lo. 4 cars.
E. H. Green, *Supt*......Pedricktown, N. J.
Delaware Western R. R. (*See Balt. & Phil.*)
Delaware & Chesapeake R. R. (*See Penna.*; (4) *Div.*)
Delaware & Hudson Canal Co.
4-3 and 4-8½ g. 634 m. 180 lo. 10,799 cars.
C. F. Young, *Gen. Man*......Honesdale, Pa.
C. F. Young, *Pur. Agt*......Albany, N. Y.
R. C. Blackall, *Supt. of Mach*......Albany, N. Y.
Susq. Div.: C. D. Hammond, *Supt*. Albany, N. Y.
Tho. Howard, *M. M*......Oneonta, N. Y.
J. R. Skinner, *M. C. B*......Oneonta, N. Y.
Sar. & Ch. Divs.: T. Voorhees, *Supt*...Troy, N. Y.
J. L. Corey, *M. M*......Green Island, N. Y.
Chr. Körner, *M. C. B*......Green Island, N. Y.
Pa. Div.: R. Manville, *Supt & Pur Agt*. and
S. H. Dotterer, *M. M*......Carbondale, Pa.
T. Orchard, *M. C. B*......Carbondale, Pa.
Denver Circle R. R. 3 g. 6 m. 3 lo. 15 cars.
Theo. C. Henry, *Gen. Man*......Denver, Col.
J. H. Bedson, *Gen. Supt*......Denver, Col.
Denver, Utah & Pacific R. R. 3 g. 34 m. 2 lo. 58 c.
L. M. Fouts, *Gen. Supt*......Denver, Col.
Denver & New Orleans. 4-8½ g. 140 m. 11 lo. 400 c.
C. W. Fisher, *Gen. Man*......Denver, Col.
Chas. Wheeler, *Pur. Agt*......Denver, Col.
J. H. Kirk, *M. M. & M. C. B*......Denver, Col.
Denver & Rio Grande Ry. 3 g. 1,665 m. 222 lo. 5,932 c.
D. C. Dodge, *Gen. Man*......Denver, Col.
A. B. Garner, *Pur. Agt*......Denver, Col.
N. W. Sample, *Supt. M. P. & M*......Denver, Col.
(1) Col & N. M. Div.: R. B. Cable, *Gen. Supt*. Denver, Col.
1st Div.: W. W. Borst, *Supt*......S. Pueblo, Col.
2d Div.: Cole Lydon, *Supt*......Alamosa, Col.
3d Div.: G. W. Cook, *Supt*......Leadville, Col
4th Div.: R. M. Ridgway, *Supt*......Salida, Col.
(2) Utah Div.: W. H. Bancroft, *G. S.* S. Lake City, Utah.
Des Moines, Osceola & Southern R. R.
3 g. 100 m. 7 lo. 253 cars.
Henry Stivers, *Gen. Supt*......Osceola, Ia.
L. D. Berry, *M. M*......Osceola, Ia.
Elias Tonet, *M. C. B*......Osceola, Ia.
Des Moines & Ft. Dodge. 4-8½ g. 144 m. 13 lo. 350 c.
C. N. Gilmore, *Supt*......Des Moines, Ia.
John McGrayel, *M. M*......Grand Junction, Ia.
E. A. Avery, *M. C. B*......Grand Junction, Ia.
Det., Gr. H. & Mil. Ry. 4-8½ g. 189 m. 39 lo. 696 c.
S. R. Callaway, *Gen. Man*......Detroit, Mich.
John S. Lorimer, *Storekeeper*......Detroit, Mich.
W. J. Morgan, *Supt*......Detroit, Mich.
H. Roberts, *Mech. Supt*......Ft. Gratiot, Mich.
Det., Lansing & No'n R. R. 4-8½ g. 222 m. 84 lo. 1027 c
John B. Mulliken, *Gen. Man*......Detroit, Mich.
Allan Bourn, *Pur. Agt*......Detroit, Mich.
Thos. M. Fish, *Gen. Supt*......Ionia, Mich.
G. C. Watrous, *M. M. & C. B*......Ionia, Mich.
Det., Mack. & Marq. R.R. 4-8½ g. 152 m. 16 lo. 1,112 c.
D. McCool, *Gen. Supt*......Marquette, Mich.
E. W. Allen, *Pur. Agt*......Marquette, Mich.
John Wilson, *Mech. Supt*......Marquette, Mich.
Dorchester & Delaware R.R. (*See Penna.* (4) *Del. Div.*)
Dubuque & Dakota R. R. 4-8½ g. 64 m. 2 lo. 54 cars.
A. C. Goodrich, *Supt*......Waverly, Ia.
W. S. Couch, *Pur. Agt*......Dubuque, Ia.
Duck River Valley R. R. (*See Nash., Chat. & St. L.*)
Dunkirk, Allegheny Valley & Pittsburgh R. R.
4-8½ g. 91 m. 14 lo. 102 cars.
D. Thayer, *Gen. Supt*......Dunkirk, N. Y.
R. C. Moore, *Pur. Agt*......New York, N. Y.
J. C. Haggett *M. M. & C. B*......Dunkirk, N. Y.

E

East Alabama Ry. 5 g. 22 m. 3 lo. 19 cars.
W. W. Barnes, *Supt*......Opelika, Ala.
East Broad Top R. R. 3 g. 30 m. 7 lo. 260 cars.
A. W. Sims, *Supt*......Orbisonia, Pa.
A. B. Greenwood, *M. M*......Orbisonia, Pa.
East St Louis & Carondelet Ry. 4-9 g. 4 lo. 27 c.
Joseph Hill, *Gen. Supt*......East St. Louis, Ill.
East Tenn. & Western North Car. R. R.
3 g. 34 m. 2 lo. 70 cars.
Thomas E. Matson, *Supt*. Elizabethton, Tenn.
East Tennessee, Virginia & Georgia R. R.
5 g. 1,453 m. 173 lo. 3,670 cars.
Henry Fink, *V. P. & Gen. Man*. Knoxville, Tenn.
J. F. O'Brien, *Gen. Supt*......Knoxville, Tenn.
W. A. Harrison, *Pur. Agt*......Knoxville, Tenn.
East Tenn. Div. and No. Car. and Ohio Branches:
F. K. Huger, *Supt*......Knoxville, Tenn.
B. J. Sitton, *M. M*......Knoxville, Tenn.
Jos. Armbruster, *M. C. B*......Knoxville, Tenn.
Alabama Div.: J. M. Bridges, *Supt*...Selma, Ala.
Simon Gay, *M. M*......Selma, Ala.
W. W. Pierce, *M. C. B*......Selma, Ala.
Memphis & Charleston R. R. (Div.):
R. B. Pegram, Jr., *Supt*......Memphis, Tenn.
H. N. Burford, *M. M*......Memphis, Tenn.
Atlanta & Georgia Divs.:
Atl. Div.: J. W. Fry, *Supt*......Atlanta, Ga.
Ga. Div.: J. E. Mallory, *Supt*......Macon, Ga.
M. J. Rogers, *M. M. & M. C. B*...Atlanta, Ga.
J. H. Perkins, *For. Car Dept*. Atlanta, Ga.
East & West R. R. of Ala. 3 g. 100 m. 6 lo. 75 c.
John Postell, *Manager*......Cross Plain, Ala.
C. E. Scruton, *M. M. & C. B*...Cedartown, Ga.
Eastern R. R. 4-8½ g. 283 m. 99 lo. 2,268 cars.
Payson Tucker, *Gen. Man*......Boston, Mass.
D. W. Sanborn, *Mast. of Trans*..Boston, Mass.
G. F. Hurd, *Pur. Agt*......Boston, Mass.
Amos Pillsbury, *S. M. P. & M*...E. Boston, Mass.
J. D. Billings, *G. For. Car Dept*...Salem, Mass.
Con'y Div.: J. W. Sanborn, *Supt*. Wolfboro J., N. H.
Eastern Kentucky R. R. 4-8½ g. 34 m. 5 lo. 160 c.
H. W. Bates, *Man. & Pur. Agt*......Riverton, Ky.
D. S. Weaver, *M. M*......Riverton, Ky.
Eastern (Maine) R. R. (*See Maine Central.*)
Eastern Shore R. R. 4-8½ g. 38 m. 3 lo. 9 c.
W. Thompson, *Supt*......Princess Anne, Md.
F. Strattner, *M. M*......Princess Anne, Md.
Elberton Air-Line R.R. (*See Rich. & Dan. N. G. Brs.*)
Elizabeth City & Norfolk R. R. (*See Norfolk So.*)
Elizabethtown, Lex. & Big Sandy R.R. (*See Ches. & O.*)
Emmitsburg R. R. (*See Western Md.*)
Erie & Pittsburg R. R. (*See Penna. Co.*; (3) *Div.*)
Eureka Springs Ry. 4-8½ g. 19 m. 1 lo. 9 cars.
Powell Clayton, *Gen. Man*. Eureka Springs, Ark.
Eureka & Palisade R. R. 3 g. 97 m. 7 lo. 125 cars.
B. Gilman, *Gen. Supt & Pur. Agt*..Eureka, Nev.
E. C. Mills, *M. M*......Palisade, Nev.
A. S. Longley, *M. C. B*......Palisade, Nev.
European & North American R. R. (*See Maine Cen.*)
Evansville, Rockport & E'n Ry. 4-9 g. 71 m. 5 lo. 98 c.
H. L. Shepard, *Supt*......Evansville, Ind.
Evansv. & Terre Haute. 4-8½ g. 169 m. 26 lo. 973 c.
D. J. Mackey, *Gen. Supt*......Evansville, Ind.
John Torrance, *M. M*......Evansville, Ind.

F

Fernandina & Jacksonville R.R. (*See Fla., Tr. & P.*)
Fitchburg R. R., 4-8½ g. 152 m. 100 lo. 3,430 cars.
John Adams, *Gen. Supt*......Boston, Mass.
E. K. Turner, *Asst. Supt*......Fitchburg, Mass.
F. S. Pratt, *Pur. Agt*......Boston, Mass.
G. A. Coolidge, *Supt. M. P*......Boston, Mass.
W. A. Foster, *Asst. Supt. M. P*..Fitchburg, Mass.
J. W. Marden, *M. C. B*......Charlestown, Mass.
Flint & Pere Marq. 4-8½ g. 346 m. 72 lo. 1,854 cars.
H. C. Potter, *Gen. Man*......E. Saginaw, Mich.
D. Edwards, *Asst. Gen. Man*..E. Saginaw, Mich.
G. G. Cook, *Pur. Agt*......E. Saginaw, Mich.
Sanford Keeler, *Gen. Supt*..E. Saginaw, Mich.
W. F. Potter, *Supt.* (E. Div.)..E. Saginaw, Mich.
M. V. Meredith, *Supt.* (W. Div.) E. Saginaw, Mich.
T. J. Hatswell, *M. M*......E. Saginaw, Mich.
R. McPherson, *M. C. B*......E. Saginaw, Mich.
Florida Central & Western R. R.
5 g. 234 m. 16 lo. 193 cars.
Wm. M. Davidson, *Gen. Man*. Jacksonville, Fla.
J. S. McElroy, *Mast. Tr. & Mach*. Tallahassee, Fla.
Florida Southern Ry. 3 g. 91 m. 6 lo. 96 cars.
Sherman Conant, *Gen. Man*......Palatka, Fla.
Jas. D. Hollister, *Supt*......Palatka, Fla.
M. R. Miller, *M. M. & C. B*......Palatka, Fla.
Florida Transit R. R. 5 g. 254 m. 15 lo. 204 c.
D. E. Maxwell, *Gen. Supt*......Fernandina, Fla.
John Hedges, *Pur. Agt*......Fernandina, Fla.
R. V. Dahoney, *M. M*......Fernandina, Fla.
G. Hernandez, *M. C. B*......Fernandina, Fla.
Fonda, Johnst'n & Gloversv. 4-8½ g. 26 m. 5 lo. 25 c.
Lawton Caten, *Supt*......Gloversville, N. Y.
G. V. Putman, *M. M*......Gloversville, N. Y.
Fond du Lac, Amboy & Peoria. 3 g. 30 m. 2 lo. 35 c.
Alonzo Kinyon, *Supt. & P. A.* Fond du Lac, Wis.
Fort Dodge & Fort Ridley R. R. (*See Minn. & St. L.*)
Ft. Madison & No.-West'n Ry. 3 g. 45 m. 5 lo. 127 c.
S. B. Kenrick, *Supt. & Pur. Agt*. Ft. Madison, Ia
I. L. Lamb, *M. M. & C. B*......Ft. Madison, Ia.
Ft. Wayne, Cin. & Louisv. 4-8½ g. 128 m. 10 lo. 250 c.
White Water R. R. 4-8½ g. 65 m. 5 lo. 170 cars.
W. W. Worthington, *Gen. Supt*...Ft. Wayne, Ind.
T. H. Haberkorn, *M. M*......Ft. Wayne, Ind.
Wm. Knight, *M. C. B*......Ft. Wayne, Ind.
Fort Worth & Denver City Ry.
4-8½ g. 114 m. 8 lo. 443 cars.
C. L. Frost, *Gen. Supt*......Fort Worth, Tex.
Freehold & New York Ry. 4-8½ g. 15 m. 4 lo. 40 c.
J. E. Ralph, *Supt. & Pur. Agt*..Keyport, N. J.
C. H. Snedeker, *M. M*......Freehold, N. J.
Fulton County N. G. Ry. 3 g. 61 m. 3 lo. 106 cars.
A. C. Atherton, *Gen. Supt. & P. Agt*. Lewiston, Ill.

G

Gainesville & Dahlonega R. R. 3 g. 15 m.
W. P. Price, *Pres*......Dahlonega, Ga.
Gainesville, Jefferson & Southern R.R. (*See Cen. of Ga*)
Gal., Harrisburg & San Antonio Ry. (*See Cen. Pac.*)
Galveston, Houston & Hend. R.R. (*See Mo. Pac.* (5) *Div.*)
Galveston, Sabine & St. Louis Ry.
4-8½ g. 12 m. 2 lo. 19 cars.
Brad. Barner, *Gen. Man*......Longview, Tex.
Chas. H. Jewell, *Gen. Supt*......Longview, Tex.
Geneva, Ithaca & Sayre R. R. (*See Lehigh Val.*)
George's Creek & Cumberland R. R.
4-9 g. 25 m. 6 lo. 212 cars.
J. A. Millholland, *Gen. Man*..Cumberland, Md.
Georgetown & Lane's R. R. 5 g. 36 m. 2 lo. 52 c.
G. W. Earle, *Gen. Supt*......Georgetown, S. C.
Georgia R. R. 5 g. 307 m. 42 lo. 1,017 cars.
John W. Green, *Gen. Man*......Augusta, Ga.
John S. Cook, *M. M*......Augusta, Ga.
T. M. Preval, *M. C. B*......Augusta, Ga.
Georgia Pacific Ry. 5 g. 218 m.
I. Y. Sage, *Supt*......Birmingham, Ala.
W. M. Sutton, *Pur. Agt*......Greenville, Miss.
Benj. Davis, *M. M*......Greenville, Miss.
J. B. Shelton, *M. C. B*......Greenville, Miss.
Grand Haven R. R. (*See Chic. & W. Mich.*)
Grand Junction Ry. (*See Midland of Can.*)
Grand Rapids, Indiana & Mackinaw. (*See Gr. R. & I.*)
G'd Rap., Newaygo & L. S. R. R. (*See Chic. & W. M.*)
Grand Rapids & Indiana. 4-8½ g. 528 m. 52 lo. 1,724 c.
W. O. Hughart, *Gen. Man*. Grand Rapids, Mich.
W. R. Shelby, *Pur. Agt*......Grand Rapids, Mich.
S. D. Bradley, *M. M*......Grand Rapids, Mich.
No'n Div.: J. M. Metheany, *Supt*. G'nd Rap., Mich.
So'n Div.: P. S. O'Rourke, *Supt*. Fort Wayne, Ind.
Grand Southern Ry. of New Brunswick.
4-8½ g. 82 m. 5 lo. 54 cars.
J. N. Greene, *Gen. Man*......St. George, N. B.
F. W. Holt, *Supt*......St. George, N. B.
Thomas Logan, *M. M*......St. George, N. B.
Grand Tower & Carbondale. 4-8½ g. 25 m. 6 lo. 357 c.
T. M. Williamson, *Supt. & P. A.*..Gr. Tower, Ill.
Hugh Smith, *M. M. & C. B*......Grand Tower, Ill.
Grand Trunk Ry. 4-8½ g. 2,332 m. 660 lo. 16,330 c.
Joseph Hickson, *Gen. Man*......Montreal, Can.
Wm. Wainright, *Asst. Man*......Montreal, Can.
Mont. Divs.: W. J. Spicer, *Supt*. Montreal, Can.
Jno. Taylor, *Gen. Storekeeper*. Montreal, Can.
Herbert Wallis, *Mech. Supt*...Montreal, Can.
Wm. McWood, *Supt. Car Dept*. Montreal, Can.
F. R. F. Brown, *Man. Lo. Wks* Montreal, Can.
J. Haskoni, *Div. M. S*......Richmond, P. Q.
Tor. Div.: E. Wragge, *Asst. Gen. Man*. Toronto, Can.
F. L. Wanklyn, *Div. M. S*......Brockville, Ont.
J. Davis Barnett, *Div. M. S*......Stratford, Ont.
Gt. West'n Div.: Chas. Stiff, *Supt*. Hamilton, Ont.
E. Baines, *Store Kpr*......London, Ont.
C. K. Domville, *Mech. Supt*......Hamilton, Ont.
C. F. Hanson, *Lo. For*......London, Ont.
J. D. McIlwain, *Supt. Car Dept*..London, Ont.
Chi. & Gr. Trunk Ry. 4-8½ g. 339 m. 103 lo. 1,191 c.
S. R. Callaway, *Gen. Man*......Chicago, Ill.
W. H. Pettibone, *Supt*......Battle Creek, Mich.
A. Judd, *Pur. Agt*......Fort Gratiot, Mich.
H. Roberts, *Mech. Supt*......Port Huron, Mich.
Grand Trunk, Georgian Bay & Lake Erie Ry. (*See G. T.*)
Great Western Ry. (*See Grand Trunk; G. W. Div.*)
Green Bay, Winona & St Paul R. R.
4-8½ g. 250 m. 19 lo. 623 cars.
Timothy Case, *Gen. Man. & P. A.* Green Bay, Wis.
A. Fenwick, *M. M*......Ft. Howard, Wis.
Green Cove Spring & Melrose R.R. 3 g. 32 m. 1 lo. 11 c.
S. Ackley, *Pres*......Philadelphia, Pa.
Greenwich & Johnsonville Ry. 4-8½ g. 15 m. 1 lo. 7 c.
J. H. Thompson, *Supt*......Greenwich, N. Y.
Gulf, Col. & Santa Fé Ry. 4-8½ g. 536 m. 43 lo. 1,400 c.
John Sealy, *Gen. Man*......Galveston, Texas.
F. P. Killeen, *Asst. Gen. Man*. Galveston, Texas.
Jno. W. Thorne, *Pur. Agt*......Galveston, Texas.
G. B. Nichols, *M. M*......Galveston, Texas.
W. H. Martin, *M. C. B*......Galveston, Texas.
Gulf, W'n Texas & Pac. Ry. 4-8½ g. 68 m. 6 lo. 74 c.
M. D. Monserrate, *Supt. & Pur. Agt*. Cuero, Tex.
James Mooney *M. M*......Cuero, Texas.

H

Halifax & Cape Breton Ry. 4-8½ g. 79 m. 9 lo. 268 c.
H. Abbott, *Manager*......New Glasgow, N. S.
J. B. Jones, *M. M*......New Glasgow, N. S.
Hannibal & St. Jo. R. R. 4-8½ g. 292 m. 76 lo. 1,906 c.
John B. Carson, *Gen. Man*......Hannibal, Mo.
T. L. Dunn, *Act. Supt*......Hannibal, Mo.
T. L. Dunn, *Ch. Eng. & Pur. Agt*..Hannibal, Mo.
Jas. Long, *Supt. M. P. & Car Dep*. Hannibal, Mo.
Hanover Branch R. R. 4-8½ g. 8 m. 2 lo. 18 cars.
E. Y. Perry, *Supt*......South Hanover, Mass.
Hanover Junction, Hanover & Gettysburg R. R.
4-8½ g. 74 m. 10 lo. 140 cars.
H. D. Scott, *Gen. Supt*......Gettysburg, Pa.
John J. Bingley *M. M*......Hanover, Pa.
Jas. Harthorn, *M. C. B*......Hanover, Pa.
Harrisburg & Potomac R. R. 4-8½ g. 35 m. 3 lo. 35 c.
R. H. Middleton, *Supt*......Boiling Springs, Pa.
Hartford & Conn. Val. R. R. 4-8½ g. 47 m. 9 lo. 196 c.
Samuel Babcock, *Gen. Supt*......Hartford, Ct.
O. M. Shepard, *Asst. Supt*......Hartford, Ct.
S. E. Brewer, *M. M. & C. B*......Hartford, Conn.
Hartford & Conn. W'n R.R. 4-8½ g. 110 m. 16 lo. 495 c.
John F. Jones, *Supt*......Hartford, Ct.
J. C. Barton, *M. M*......Hartford, Ct.
Hartwell R. R. (*See Rich. & Dan.; N. G. Brs.*)
Hecla & Torch Lake R. R. 4-1 g. 5 m. 5 lo. 165 cars.
W. A. Childs, *Gen. Man*......Calumet, Mich.
Herkimer, Newport & Poland Ry.
3-6 g. 17 m. 2 lo. 24 cars.
Albert Wilber, *Supt*......Herkimer, N. Y.
Hobart & Manistee River R. R. 3 g. 9 m. 2 lo. 42 c.
H. W. Marsh, *Supt*......Hobart, Mich.
Hopkinton, Milford & Woonsocket R. R. 22 m.
E. T. Logee, *Supt*......Milford, Mass.
Hot Springs R. R. 3 g. 25 m. 3 lo. 37 cars.
J. N. Conger, *Supt*......Hot Springs, Ark.
L. Finlay, *M. M*......Malvern, Ark.
Housatonic R. R. 4-8½ g. 126 m. 25 lo. 571 cars.
W. H. Yeomans, *Supt*......Bridgeport, Ct.
D. S. Draper, *Pur. Agt*......Bridgeport, Ct.
N. Slingland, *M. M*......Falls Village, Ct.
J. J. Ferris, *M. C. B*......Falls Village, Ct.
Houston Belt Ry. 4-8½ and 3 gauge 16 miles.
S. L. Werden, *V. P. & Gen. Man*. Houston, Tex.
Houston, East & West Tex. Ry. 3 g. 150 m. 10 lo. 570 c.
Paul Bremond, *Pr. & Pur. Agt*..Houston, Tex.
E. L. Bremond, *Gen. Man*......Houston, Tex.
B. O. Diffey, *M. M*......Houston, Tex.
C. F. Schelewa, *M. C. B*......Houston, Texas.
Houston & Tex. Cen. Ry. 4-8½ g. 750 m. 78 lo. 2,526 c.
J. Waldo, *V. Pr. & Gen. Man*......Houston, Tex.
A. H. Swanson, *Gen. Tr. Man*......Houston, Tex.
E. S. Larchar, *Pur. Agt*......New York, N. Y.
L. C. Noble, *Gen. M. M*......Houston, Tex.
James McGee, *M. C. B*......Houston, Tex.
So. & Wn. Divs.: M. G. Howe, *Supt*. Houston, Tex.
No. & Ml. Divs.: G. A. Quinlan, *Supt.*, and
C. H. Burns, *Asst. M. M*......Corsicana, Tex.
No.-Wn. Div.: Donald Allen, *Supt*......Waco, Tex.
Humeston & Shenandoah R. R.
4-8½ g. 113 m. 18 lo. 80 cars.
F. O. Wyatt, *Gen. Man*......Clarinda, Ia.
M. B. Snyder, *M. M*......Clarinda, Ia.
Huntingdon & Br. Top Mt. 4-8½ g. 62 m. 18 lo. 69 c.
Geo. F. Gage, *Gen. Supt*......Huntingdon, Pa.
Samuel B. Knight, *Pur. Agt*..Philadelphia, Pa.
William Barkla *M. M*......Saxton Pa.

I

Illinois Central R. R. 4-8½ g. 1,909 m. 327 lo. 8,511 c.
Jas. C. Clark, *Gen. Man*......Chicago, Ill.
E. T. Jeffery, *Gen. Supt*......Chicago, Ill.
O. Ott, *Pur. Agt*......Chicago, Ill
Henry Schlacks, *Supt. of Mach*......Chicago, Ill.
W. B. Snow, *M. M. Car Works*......Chicago, Ill.
(1) Ill. & Ia. Divs.: C. A. Beck, *Supt*......Chicago, Ill.
Chic. Div.: T. J. Hudson, *Supt*......Cairo, Ill
Wm. Renshaw, *Act. M. M*......Chicago, Ill.
Mid. Div.: H. L. Frisbie, *Supt*......Pontiac, Ill.
Spring. Div.: W. Wilkinson, *Supt*. Springfield, Ill.
W. B. McKenna, *M. M*......Clinton, Ill.
No'n Div.: J. C. Jacobs, *Supt*......Amboy, Ill.
J. B. Edams, *M. M*......Amboy, Ill.
So. Div.: David Oxley, *M. M*......Centralia, Ill.
Ia. Div.: M. Gilleas, *Supt*......Dubuque, Ia.
Thos. W. Place, *M. M*......Waterloo, Ia.
(2) N. O. Divs.: C. M. Sheafe, *Supt*..New Orleans, La.
W. H. Purdy, *Supt. Mach*..McComb City, Miss.
Geo. W. Baxter, *M. C. B*..McComb City, Miss.
So. Div.: H. W. Clarke, *Acting Supt*. do.
W. P. McKinley, *M. M*......McComb City, Miss.
No. Div.: J. G. Mann, *Supt*......Jackson, Tenn.
J. M. Keith, *M. M*......Jackson, Tenn.
J. F. White, *M. M*......Water Valley, Miss.
Illinois Midland Ry. 4-8½ g. 176 m. 12 lo. 611 cars.
D. H. Conklin, *Rec. & Gen. Man*......Decatur, Ill.
O. E. Grady, *Train Mast*......Decatur, Ill.
Frank Young, *For. Shops*......Paris, Ill.
Illinois & St. Louis R. R. 4-8½ g. 19 m. 8 lo. 402 c.
C. H. Sharman, *Gen. Supt. & P. A.* St. Louis, Mo.
D. J. Timlin, *M. M*......Belleville, Ill.
Charles Rothe, *M. C. B*......E. St. Louis Ill.
Indiana, Bloomington & Western Ry.
4-8¾ g. 826 m. 112 lo. 4,067 cars.
C. E. Henderson, *Gen. Man*. Indianapolis, Ind.
I. H. Wilson, *Gen. Supt*......Indianapolis, Ind.
H. C. Norton, *Pur. Agt*......Indianapolis, Ind.
B. Warren, *Gen. M. M*......Indianapolis, Ind.
Peoria Div.: E. Hiserodt, *M. M*......Urbana, Ill.
St. Louis Div.: John King, *M. M*. Indianapolis, Ind.
Ohio So. Rd.: D. R. Ennis, *Supt*......Springfield, O.
Jos. S. Porter, *M. M*......Sandusky, O.
Indiana, Illinois & Iowa R.R. 4-8½ g. 104 m. 5 lo. 83 c.
F. M. Drake, *Gen. Man*......Kankakee, Ill.
T. P. Shonts, *Gen. Supt*......Kankakee, Ill.
H. V. Vedder, *M. M*......Streator, Ill.
Indiana & Illinois Southern Ry. 3 g. 91 m. 3 lo. 69 c.
W. C. Lyon, *Gen. Man. & P. Agt*. Robinson, Ill.
J. S. Pickering, *M. M. & C. B*...Effingham, Ill.
Indianapolis, Decatur & Springfield Ry.
(*See Ind., Bloom. & West'n.*)
Indianapolis & St. Louis R. R. (*See C., C., C. & I.*)
Indianapo. & Vincennes R. R. (*See Penna. Co.*; (8) *Div.*)
Intercolonial Ry. 4-8½ g. 846 m. 135 lo. 4,500 cars.
David Pottinger, *Chief Supt*......Moncton, N. B.
T. V. Cook, *Gen. Storekeeper*...Moncton, N. B.
H. A. Whitney, *Mech. Supt*......Moncton, N. B
Ewd. D. Shaffer, *M. C. B*......Moncton, N. B.
Monc. Div.: J. E. Price, *Supt*..Cambellton, N. B.
Hal. & St. J. Div.: J. J. Wallace, *Supt*..Truro, N. P
Levis Div.: A. McDonald, *Supt*. Rivière du Loup, Q.
International Ry. 4-8½ g. 69 m. 7 lo. 12 cars.
D. E. McFee, *Supt*......Sherbrooke, Que
J. Rueile, *M. M*......Sherbrooke, Que.
W. Charest, *M. C. B*......Sherbrooke, Que.
International & Gt. N'n R. R. (*See Mo. Pac.*; (5) *Div.*)
Iowa Falls & Sioux City R. R. (*See Ill. Cen.*)
Iron Ry. (*See Tol., Cin. & St. L.*)
Iron Mountain & Helena R. R. (*See Mo. Pac.*; (4) *Div.*)
Ithaca, Auburn & Western Ry. (*See Southern Cen.*)

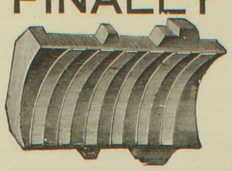
J

Jacksonville So.-E'n R. R. 4-8½ g. 54 m. 5 lo. 69 c.
E. S. Greenleaf, *Supt*......Jacksonville, Ill.
Ira F. Petrie, *M. M*......Jacksonville, Ill.
Jacksonville, St. Augustine & Halifax River Ry.
3 g. 76 m. 2 lo. 27 cars.
W. L. Crawford, *Gen. Man*..Jacksonville, Fla.
H. S. Ming, *Supt*......Jacksonville, Fla.
Jacksonv., Pensacola & Mob. (*See Fla. Cent. & W.*)
Jamesville & Washington R. R. (*See Norfolk So'n.*)
Jeffersonv'l, Madison & Indpls. R. R. (*See* (9) *Pa. Co.*)
Jersey City & Albany R. R. 4-8½ g. 38 m.
J. W. McCulloh, *Manager*......Jersey City, N. J.
Jersey City & Bergen R. R. 4-8½ g. 6 m. 2 lo. 13 c.
T. M. Sayre, *Gen. Supt*......Jersey City, N. J.
Jersey Shore, Pine Creek & Buff. Ry. (*See Phil. & R.*)
Junction & Breakwater R.R. (*See Del., Md. & Va.*

K

Kaaterskill R. R. 3 g. 8 m.
J. H. Jones, *Supt*......Rondout, N. Y.
Kankakee & Seneca R.R. (*See Cin., Ind., St. L. & Chi.*)
Kansas Central R. R. (*See Union Pacific.*)
Kansas City, Fort Scott & Gulf R. R.
4-8½ g. 389 m. 34 l. 1,377 c.
Geo. H. Nettleton, *Gen. Man*..Kansas City, Mo.
L. W. Towne, *Gen. Supt*......Kansas City, Mo.
H. P. Jacques, *Pur. Agt*......Kansas City, Mo.
J. S. McCrum, *M. M*......Kansas City, Mo.
A. N. Montier, *M. C. B*......Kansas City, Mo.
Kansas Cy, Lawrence & So Kan. (*See At., Top. & S. F.*)
Kansas City, Springfield & Memphis R. R.
4-8½ g. 275 m. 10 lo. 125 cars.
George H. Nettleton, *Pres*......Kansas City, Mo.
Kansas City, St. Joseph & Council Bluffs; and St. Jo. & Des Moines R. Rs. 4-8½ & 3 g. 368 m. 41 lo. 1,148 c.
J. F. Barnard, *Gen. Supt. & P. A.* St. Joseph, Mo.
Wm. Irving, *Pur. Agt*......Chicago, Ill.
F. A. Chase, *M. M*......St. Joseph, Mo.
Thos. Aylesbury, *G. For. Car. Dep*. St. Joseph, Mo.
Kansas City & Southern Ry. 4-8½ g. In progress.
Wm. Bailey, *Pres*......Kansas City, Mo.
Kansas Coal Belt R. R. 4-8½ g. In progress.
C. H. Malin, *Gen. Man*......Girard, Kan.
F. A. Hill, *Supt*......Girard, Kan.
Kansas & Gulf Short Line R. R. 33 m. 2 lo. 32 cars.
Eli Culverhouse, *Gen. Man*......Tyler, Tex.
V. K. Stevenson, *Pur. Agt*......New York, N. Y.
Kendall & Eldred R. R. (*See Buf., N. Y. & Phil.*)
Kent Northern Ry. 4-8½ g. 20 m. 1 lo. 8 cars.
J. C. Brown, *Gen. Man*......Richibucto, N. B.
Kentucky Central R. R. 4-9 g. 184 m. 22 lo. 640 cars.
G. W. Bender, *Supt*......Covington, Ky.
A. H. Watts, *M. of Mach*......Covington, Ky.
J. L. Hackathorn, *M. C. B*......Covington, Ky.
Kentucky & South Atlantic Ry. 3 g. 23 m. 3 lo. 52 c.
Geo. B. Harper, *Supt. & P. A.*..Mt. Sterling, Ky
S. P. Hatfield, *M. M*......Mt. Sterling, Ky.
Keokuk & Des Moines R.R. (*See Chi., R. I. & Pac.*)
Kinzua R. R. (*See Buf., N. Y. & Phil.*)
Kingston & Pembroke Ry. 4-8½ g. 73 m. 7 lo. 124 c.
B. W. Folger, *Supt*......Kingston, Ont.
C. F. Gildersleeve, *Pur. Agt*......Kingston, Ont.
Geo. Becker, *M. M*......Kingston, Ont.
Knox & Lincoln R. R. 4-8½ g. 49 m. 5 lo. 103 cars.
C. A. Coombs, *Supt*......Bath, Me.
Wm. A. Field, *M. M*......Bath, Me.
C. L. Turner, *M. C. B*......Bath, Me.
Knoxville & Augusta R. R. 5 g. 16 m. 2 lo. 34 cars.
J. M. Hood, *Supt*......Knoxville, Tenn.
M. R. Hood, *Pur. Agt*......Knoxville, Tenn.

LE ROY FINALLY VICTORIOUS.



The following is the FINAL decision of the Patent Office in the matter of the Interference of HOPKINS vs. LE ROY, rendered August 31, 1883:

"COPY."

Department of the Interior, United States Patent Office,
Washington, D. C., Sept. 1, 1883.

"In the matter of the interference of
HOPKINS vs. LE ROY.
On Appeal to the Commissioner.

"For a Journal Box composed of Hard and Soft Metal, the **SOFT METAL BANDS PROJECTING ON THE JOURNAL BEARING SIDE BEYOND THE SURFACE OF THE HARD METAL**, Priority of Invention Must be Awarded to LE ROY."

By direction of the Commissioner.
Very respectfully,
(Signed) **SCHUYLER DINGEE, Chief Clerk.**

To T. V. LE ROY, Care John R. Bennett, No. 237 Broadway.
George Harding, Counsel.

It is falsely pretended that our invention infringes an alleged patent held by Mr. Hopkins. We hereby offer **$2,500** *to Mr. Hopkins if he will commence and prosecute in good faith an action against us to settle the point; and, as we believe he has no valid patent, we stand ready to manufacture and sell his brasses in order that he may sue us. See Babbitt Patent, Sept. 4, 1840, and Joseph Gordnan, March 12, 1861. GEORGE W. McLEAN, President.*

Thus reversing all former decisions made in favor of HOPKINS, dissolving the interference heretofore declared in his favor, and sustaining the validity of the LE ROY Patent and every claim made by LE ROY for his Invention.

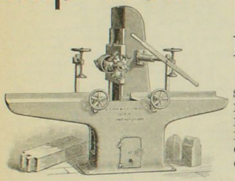
LE ROY JOURNAL BEARING CO.,

145 Broadway, New York City.
GEO. W. McLEAN, President.

Improved Wood-Working Machinery

FOR

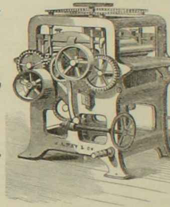
Railroad, Car and Bridge Shops, Government Arsenals and Navy Yards,



Vertical End Tenoner.

EMBRACING MACHINES FOR

- SILL AND TIMBER DRESSING,
- PLANING, MATCHING AND BEADING,
- MOLDING AND SHAPING,
- MORTISING AND BORING,
- CAR GAINING,
- CAR BORING, ETC., ETC.,
- BAND AND SCROLL SAWING,
- CIRCULAR AND BAND RESAWING,
- SELF-FEEDING RIPPING & CROSS-CUTTING,
- ROTARY CAR MORTISING AND BORING,
- SAND PAPERING,
- CAR TENONING, ETC., ETC.



Sand-Papering Machine.

Illustrations and Estimates furnished upon application to

W. H. DOANE, President.
D. L. LYON, Secretary.

J. A. FAY & CO., Cincinnati, Ohio, U. S. A.

NATIONAL RAILWAY PATENT WASTE COMPANY.

The most economical, efficient and desirable material for packing JOURNAL BOXES of CARS is Cotton Seed Hulls.

The company proposes to license railroads to use this valuable article for packing, on very liberal terms Send for circular to

H. W. GUERNSEY, President,
240 Broadway, New York.

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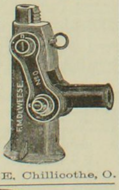
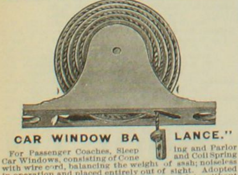
Made of the best air-furnace malleable iron, and on scientific principles. Are used by about two hundred railroad companies. Seven sizes, ranging in capacity from four to twenty tons, suited to every department of railroad use and fully guaranteed.



Price-list and discounts furnished on application o manufacturer.

F. M. DEWEESE, Chillicothe, O.



CAR WINDOW BALANCE."

For Passenger Coaches, Sleeping and Parlor Car Windows, consisting of Cone and Coil Spring with wire cord, balancing the weight of sash; noiseless in operation and placed entirely out of sight. Adopted by many of the leading roads. No car complete without them.

O. K. GARDNER, Manufacturer,
28 and Railroad Sts., Pittsburgh, Pa.

THE MACHINE TOOL WORKS.

FREDERICK B. MILES.

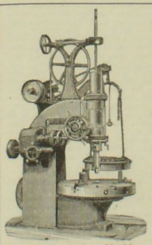
(Formerly FERRIS & MILES.)

TWENTY-FOURTH and WOOD STREETS, PHILADELPHIA, PA.

SEVEN PRIZE MEDALS, CHICAGO EXPOSITION, 1883

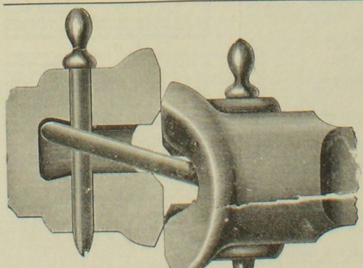
FOR THE BEST

- AXLE TURNING MACHINERY,
- CAR WHEEL BORING AND TURNING MACHINE,
- HYDRAULIC WHEEL PRESS,
- IRON PLANING MACHINE,
- RADIAL DRILLING MACHINE,
- SLOTTING MACHINE,
- STEAM HAMMER.



Car Wheel Boring Machine.
Awarded GOLD MEDAL.

SAFFORD'S SAFETY DRAW-BAR.



"VICTORY OVER MORE THAN 30 CONTESTANTS."

Victory over more than 30 Self-Couplers in the Master Car-Builder's Convention of June, 1876. Also indorsement for safety in coupling by the Yard Masters, in their Convention, June, 1877, and by 300 others who were unable to attend the Convention, and 300 railroad officials who are resident in 26 States, and who admitted superiority over any other yet produced. Try 30 free of royalty, and see for yourself! Pattern free, and no change in timbers or connections. Those made by Wilson, Walker & Co., Pittsburgh, Pa., *will save* 200 *per cent. in repairs*, and give double life service over *old styles of* wrought iron. About 43,000 in use by 146 railroads. The *saving in repairs* by using *my invention* is from 20 per cent. to 80 per cent. as per *report of many officers.*

J. B. SAFFORD,

EAGLE IRON WORKS

BUFFALO, N. Y.

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SEND FOR A CATALOGUE.

OSWALD McALLISTER,

Successor to W. Y. McALLISTER.

PHILADELPHIA, PA.

L

Lackawanna & Pittsburg R. R. 3 g. 101 m.
R. M. Patterson, *Gen. Supt*...Friendship, N. Y.
Lake Champlain & Moriah R.R. 4-8½ g. 8 m. 8 lo. 222c.
E. B. Hedding, *Supt*.........Port Henry, N. Y.
Lake Erie & Western Ry. 4-8½ g. 388 m. 43 lo. 1,623 c.
D. S. Hill, *Gen. Supt*..........Bloomington, Ill.
T. H. Perry, *Pur. Agt*..........Bloomington, Ill.
H. L. Cooper, *Supt. of Equipment*....Lima, O.
Lake George & Muskegon River R. R.
4-8½ g. 20 m. 4 lo. 79 cars.
W. S. Gerrish, *Gen. Man*....Muskegon, Mich.
Lake Shore & Michigan So'n Ry.
4-8½ g. 1,340 m. 547 lo. 17,115 cars.
John Newell, *Gen. Man*..........Cleveland, O.
P. P. Wright, *Gen. Supt*..........Cleveland, O.
A. C. Armstrong, *Pur. Agt*........Cleveland, O.
G. W. Stevens, *Gen. M. M*........Cleveland, O.
John Kirby, *Gen. M. C. B*.........Cleveland, O.
East'n Div.: C. B. Couch, *Supt*.....Cleveland, O.
J. S. Graham, *M. M*...........Buffalo, N. Y.
A. C. Robson, *M. C. B*..........Buffalo, N. Y.
L. O. Gassett, *M. M*...........Cleveland, O.
J. Withycombe, *M. C. B*.........Cleveland, O.
Frank. Div.: G. H. McIntire, *Supt.* Youngstown, O.
Toledo Div.: Thos. Flesher, Jr., *Supt.* Cleveland, O.
J. M. Sanborn, *M. M*..............Norwalk, O.
W. O. Smith, *M. C. B*.............Norwalk, O.
Mich. Divs.: J. E. Curtis, *Supt*.........Toledo, O.
Det. Brs.: T. J. Charlesworth, *Supt*. Detroit, Mich.
Lansing, Ypsilanti & Ft. Wayne Branches.
W. H. Caniff, *Supt*............Hillsdale, Mich.
Western Div.: A. G. Amsden, *Supt*...Chicago, Ill.
W. L. Gilmore, *M. M*............Elkhart, Ind.
Frank O. Bray, *M. C. B*..........Adrian, Mich.
Gr. Rap. Br.: M. E. Wattles, *Supt.* Kalamazoo, Mich.
Lake Tahoe R. R. 3 g. 10 m. 3 lo. 49 cars.
D. L. Bliss, *Gen. Man*..........Carson, Nev.
John T. Rogers, *Gen. Supt*.......Carson, Nev.
Geo. R. Lindsay, *M. M*...........Carson, Nev.
Leavenworth, Topeka & So. W'n Ry. (*See A. T. & S. F.*)
Lebanon Springs R. R. 4-8½ g. 58 m. 5 lo. 44 c.
W. C. Alstyne, *Manager*.......Albany, N. Y.
J. K. Hotaling, *Pur. Agt*.........Albany, N. Y.
Geo. Tefft, *M. M*................Chatham, N. Y.
Lehigh Valley R. R. 4-8½ g. 559 m. 369 lo. 36,125 c.
H. S. Goodwin, *Gen. Supt*.......Bethlehem, Pa.
W. C. Alderson, *Pur. Agt*.....Philadelphia, Pa.
John I. Kinsey, *M. M*............So. Easton, Pa.
John S. Lentz, *M. C. B*..........Packerton, Pa.
N. J. Div.: Jas. Donnelly, *Supt.* Perth Amboy, N. J.
Coal Rds.: J. I. Blakeslee, *Supt.* Mauch Chunk, Pa.
D. Clark, *M. M*..................Hazleton, Pa.
John Campbell, *M. M*...............Delano, Pa.
B. M. Div.: A. G. Brodhead, *S.*.Mauch Chunk, Pa.
P. Hofecker, *M. M*..............Weatherly, Pa.
Wy. Div.: A. Mitchell, *S. & M. M.* Wilkesbarre, Pa.
Pa. & N. Y.; and Geneva, Ithaca & Sayre R. Rs.
Wm. Stevenson, *Supt*...............Sayre, Pa.
J. N. Weaver, *M. M*...............Sayre, Pa.
Lehigh & Hudson River Ry. 4-8½ g. 63 m. 8 lo. 350 c.
Grinnel Burt, *Gen Man*.........Warwick, N. Y.
John Sayre, *Pur. Agt*..........Warwick, N. Y.
W. L. Anderson, *Supt*...........Warwick, N. Y.
S. Mills, *M. M*..................Warwick, N. Y.
Lehigh & Lackawanna and Lehigh & Susquehanna R. Rs. (*See Phil. & Read.; N. J. Cen. Div.*)
Levis & Kennebec R. R. (*See Quebec Cen.*)
Ligonier Valley R. R. 4-9 g. 11 m. 2 lo. 22 cars.
Thos. A. Mellon, *Gen. Manager*... Pittsburg, Pa.
Geo. Senft, *Supt. & P. Agt*........Latrobe, Pa.
Little Miami R. R. (*See Penna. Co.'s Rds.; (8) Div.*)
Little Rock, Miss. River & Texas Ry.
4-8½ g. 170 m. 12 lo. 299 cars.
H. Wood, *Gen Man*..........Little Rock, Ark.
J. A. Woodson, *G. S. & P. A.* Little Rock, Ark.
F. Hufsmith, *M. M. & C. B.*..Arkansas City, Ark.
Little Rock & Fort Smith. 4-8½ g. 168 m. 12 lo. 353 c
Hy. Wood, *Gen. Man*..........Little Rock, Ark.
T. Hartman, *Gen. Supt*.......Little Rock, Ark.
F. Hufsmith, *M. C. B*..............Argenta, Ark.
Little Saw Mill Run R. R. 3 & 4-8½ g. 8 m. 4 lo. 327 c.
T. Hartley, *Gen. Man*..........Banksville, Pa.
Long Island R. R. 4-8½ g. 352 m. 92 lo. 953 cars.
I. D. Barton, *Gen. Supt*..Long Island City, N. Y.
Benj. Norton, *Pur. Agt*..Long Island City, N. Y.
C. A. Thompson, *M. M. & C. B.* do.
W. B. Turner, *M. M*........Hunter's Point, L. I.
O. Fairhurst, *M. M*...........Greenpoint, L. I.
Longview & Sabine Valley R. R. (*See Gal. Sab. & St. L.*)
Louisiana W'n R. R. (*See Cen. Pac.; G., H. & S. A. Div.*)
Louisville, Cin. & Lexington R. R. (*See Louis. & N.*)
Louis., Evans. & St. L. Ry. 4-8½ g. 254 m. 24 lo. 1,032 c.
Webster Snyder, *Gen. Man*.....Louisville, Ky.
W. H. Field, *Pur. Agt*..........Louisville, Ky.
Geo. N. Sceets, *M. M*...........Evansville, Ind.
Louisville, New Albany & Chicago Ry.
4-8½ g. 470 miles 56 lo. 3,700 cars.
John MacLeod, *Gen. Supt*.......Louisville, Ky.
G. C. Breed, *Pur. Agt*..........Louisville, Ky.
Josiah Bettis, *M. M. & C. B*...New Albany, Ind.
Nor. Div.: W. G. Sala, *Supt*..........Chicago, Ill.
So. Div.: W. N. Marshall, *Supt.* New Albany, Ind.
Louisville, New Orleans & Tex. Ry. 450 m. In progress.
R. T. Wilson, *Dir.* 2 Exchange Ct., New York.
Louisville & Nashville R. R.
5 g. 2,090 m. 367 lo. 11,353 cars.
B. Dunham, *Gen Man*..........Louisville, Ky.
P. P. Huston, *Pur. Agt*..........Louisville, Ky.
B. Dunham, *Gen. Supt. Trans*....Louisville, Ky.
Reuben Wells, *Supt. Mach*..... Louisville, Ky.
Louisv. Divs.; and Louisv., Cin. & Lex. Ry. (Cin. Div.)
J. G. Metcalf, *Supt. Trans*...... Louisville, Ky.
P. Leeds, *M. M.* (Lo. Div.)...... Louisville, Ky.
J. W. Luttrell, *M. M.* (Cin. Div.). Louisville, Ky.
J. G. Clifford, *M. M.* (2d & C. Div.). Bowling Grn. Ky.
Henderson Div.: L. Hege, *Supt*...Henderson, Ky.
W. P. Pike, *M. M*..............Henderson, Ky.
Nash. & D. Div.: J. Geddes, *Supt.* Nashville, Tenn.
S. & N. A. Div.: E. Marsh, *Supt.* Birmingham, Ala.
C. W. White, *M. M*........Birmingham, Ala.
Mob. & M.; N. Div. Pens. & Sel.; Sl. & Mont. R. Rs.:
M. S. Belknap, *Supt*...........Montgomery, Ala.
J. N. Hall, *M. M.* (Mont. Shops). Montgomery, Ala.
N. O. Div.: J. T. Harrahan, *Supt.* New Orleans, La.
Wm. Adair, *M. M*.................. Mobile, Ala.
Memp. Div.: W. Colcamp, *Supt.* Memphis, Tenn.
J. V. Slusser, *M. M*.............Memphis, Tenn.
St. L. Div.: C. O. Parker, *Supt.* Montgomery, Ala.
Thos. Walsh, *M. M*...........Mt. Vernon, Ill.
Pensacola and So. Div. Pens. & Selma Rds.:
E. O. Saltmarsh, *Supt*...........Pensacola, Fla.
R. B. Small, *M. M*................Pensacola, Fla.
Louisville & Wadley R. R. 5 g. 10 m. 1 lo. 5 c.
J. H. Wilkins, *Supt. & Pur. Agt.* Louisville, Ga.

M

Macon & Brunswick R. R.
(*See E. Tenn., Vir. & Ga.; At. & Ga. Divs.*)
Maine Central R. R. 4-8½ g. 465 m. 59 lo. 1,335 c.
Payson Tucker, *Gen. Man*........Portland, Me.
Ira K. Russell, *M. M*............ Waterville, Me.
C. H. Kenison, *M. C. B*............Augusta, Me.
Eastern Maine. 3 g. 19 m. 2 lo. 40 c.
L. L. Lincoln, *Supt*.............Bucksport, Me.
Manchester & Keene R. R. 4-8½ g. 30 m. (*See Concord.*)
Manchester & Lawrence R. R. (*See Concord.*)
Manchester & North Weare R. R. (*See Concord.*)
Manhattan Ry. 4-8½ g. 32 m. 219 lo. 630 pass. c.
Frank K. Hain, *Gen. Man*.....New York, N. Y.
C. L. Green, *Supt*..............New York, N. Y.
T. W. Peeples, *M. M*...........New York, N. Y.
H. A. Webster, *M. C. B*.........New York, N. Y.
Manhattan, Alma & Burlingame Ry. (*See A., T. & S. F.*)
Manitoba Southwestern Colonization Ry.
4-8½ g. 52 m. 3 lo. 125 cars.
J. M. Eagan, *Gen. Supt*.........Winnipeg, Man.
Chas. Newell, *M. M*............Winnipeg, Man.
Marietta & Cincinnati R. R. (*See Cin. Wash. & Balt.*)
Marietta & North Georgia R. R. 3 g. 60 m. 3 lo. 7 c.
J. B. Glover, *Supt. & P. Agt*..... Marietta, Ga.
E. A. Withers, *M. M*...............Marietta, Ga.
Marquette, Houghton & Ontonagon R. R.
4-8½ g. 100 m. 42 lo. 2,530 cars.
Samuel Schoch, *Gen. Man*.....Marquette, Mich.
M. B. McGee, *Pur. Agt*.......Marquette, Mich.
W. H. Williams, *M. M*........Marquette, Mich.
H. D. Lyons, *M. C. B*..........Marquette, Mich.
Maryland Central R. R. 3 g. 27 m. 4 lo. 56 cars.
S. G. Boyd, *Supt*..................Baltimore, Md.
Massachusetts Central R. R. 4-8½ g. 48 m. 5 l. 81 c.
E. G. Allen, *Supt. & Pur. Agt*....Boston, Mass.
E. A. Walker, *M. M*........So. Sudbury, Mass.
McComb, Deshler & Toledo R. R.
(*See Cin., Ham. & Day.; D. & M. Div.*)
Meadville Ry. (*See Penna. Co.'s Rds.; (2) Div.*)
Memphis & Charleston R. R. (*See E. Tenn. Va. & Ga.*.
Memphis & Lit. Rock R. R. 5 g. 135 m. 14 lo. 299 c.
E. K. Sibley, *G. Man. & P. A.*..Little Rock, Ark.
H. G. Fleming, *Supt*.............Memphis, Tenn.
Thos. Rennell, *M. M*..............Argenta, Ark.
P. Twitchell, *M. C. B*..............Argenta, Ark.
Mexican Ry. 4-8½ g. 293 m. 42 lo. 616 cars.
E. W. Jackson, *Gen. Man*.........Mexico, Mex.
Mexican Central Ry. 4-8½ g. 680 m. 73 lo. 818 c.
Howard Hinckley, *Pur. Agt*...Boston, Mass.
Main Line: 309 m.
D. B. Robinson, *Gen. Man*.....City of Mexico.
J. H. Garner, *Supt. Trans*....City of Mexico.
J. G. McCuen, *Gen. M. M*...Chihuahua, Mex.
F. W. Johnstone, *M. M*........City of Mexico.
J. H. O'Brien, *M. C. B*.........City of Mexico.
Chihuahua Div.: 371 m.
D. B. Robinson, *G. Supt*. El Paso del Norte, Mex.
Supt. R. S...El Paso del Norte, Mex.
Tampico Div.: 262 m. In progress.
Edward A. Whorf, *Supt*.....Tampico, Mex.
Mexican National Ry. 3 g. 766 m. 50 lo. 1,283 c.
Texas Mexican Ry. 3 g. 171 m. 10 lo. 212 c.
G. C. Gardner, *Gen. Man*....New York, N. Y.
J. Dougherty, *Pur. Agt*.......New York, N. Y.
Galv. Div. T. M. Ry.: M. Quin, *Supt.* Galveston, Tex.
No. Div. Mex. Nat. Ry. & So. Div. Tex.-Mex. Ry.
F. A. Lister, *Supt*.............Laredo, Texas.
Jno. Harding, *M. M. & C. B.* Corpus Christi, Tex.
So. Div. M. N. Ry.: W. E. Lewis, *Supt.* Mexico, Mex.
J. M. Winslow, *M. M*..............Mexico, Mex.
Mat. Div.: F. E. Butterfield, *Supt.* Matamoras, Mex.
Mexican, Oriental, Inter-Oceanic & International R. R. 1,400 miles. In progress.
G. M. Dodge, *Pres.* 195 B'way, New York, N. Y.
Michigan Cen. R. R. 4-8½ g. 1,485 m. 357 lo. 11,284 c.
H. B. Ledyard, *Gen. Man*.........Detroit, Mich.
Allan Bourn, *Pur. Agt*...........Detroit, Mich.
S. H. Edgerly, *Gen. M. M*.......Jackson, Mich.
Robert Miller, *Gen. M. C. B*......Detroit, Mich.
(1) Lines West of Detroit River:
E. C. Brown, *Gen. Supt*........Detroit, Mich.
East. Div.: D. S. Sutherland, *Supt.* Detroit, Mich.
Bay City, Saginaw & Mackinaw Divisions.:
W. A. Vaughan, *Supt*.........Bay City, Mich.
C. E. Smart, *M. M*.............Bay City, Mich.
Main Line: Gr. Rap.; So. Bend; and So. Hav. Divs.:
C. B. Bush, *Supt*.............. Jackson, Mich.
W'n Divs.: R. H. L'Hommedieu, *Supt.* Chicago, Ill.
(2) Lines East of Detroit River:
Wm. H. Perry, *Agt*.............Buffalo, N. Y.
J. E. Morford, *Supt*.........St. Thomas, Ont.
Rob't Potts, *M. C. B*..........St. Thomas, Ont.
Michigan & Ohio.
Luther Allen, *Supt*.....................Toledo, O.
D. J. Durrell, *M. M*............ Marshall, Mich.
Middleburg & Schoharie; and
Schoharie Valley R. Rs. 4-8½ g. 11 m. 2 lo. 6 cars.
P. S. Danforth, *Gen. Supt*... Middleburg, N. Y.
Midland of Canada. 4-8½ g. 452 m. 48 lo. 1,423 c.
Geo. A. Cox, *Gen. Man*.....Peterborough, Ont.
W. B. Ferguson, *Gen. Supt.* Peterborough, Ont.
C. H. Crofts, *Storekeeper*...Peterborough, Ont.
J. D. Barnett, *Mech. Supt*......Port Hope, Ont.
Edward Douglas, *M. C. B*......Port Hope, Ont.
H. Harry, *M. C. B*..................Lindsay, Ont.
Tor. & Nipissing Div.: J. Haggas, *M. M.* Uxb'ge, Ont.
Chas. E. Caron, *M. C. B*.......Uxbridge, Ont.
Midland No. Carolina Ry. 5 g. 95 m. 9 lo. 82 cars.
Atlantic & North Carolina Ry. 22 m.
John Gatling, *Gen. Man*..........Newbern, N. C.
J. A. Bryan, *Supt*................Newbern, N. C.
D. J. Sprague, *Pur. Agt*.......New York, N. Y.
B. Manly, *Supt. of Mach*.........Newbern, N. C.
Milwaukee, Lake Shore & Western Ry.
4-8½ g. 322 m. 40 lo. 1,536 cars.
H. G. H. Reed, *Gen. Man. & P. Agt.* Milwaukee, Wis.
J. Donahue, *Supt*..............Milwaukee, Wis.
Chas. S. Hayden, *Asst. Supt*...Manitowoc, Wis.
David B. Curtis, *Asst. Supt*.... Oshkosh, Wis.
John Hickey, *M. M*...........Manitowoc, Wis.
Milwaukee & Northern and Wisconsin & Michigan R. Rds. 4-8½ g. 204 m. 15 l. 430 cars.
C. F. Dutton, *Gen. Supt*.......Milwaukee, Wis.
N. S. Kimball, *M. M*............Green Bay, Wis.
Mineral Range R. R. 3 g. 13 m. 4 lo. 43 cars.
Chas. E. Holland, *Pr. & Supt*...Hancock, Mich.
W. H. Carr, *Pur. Agt*............Hancock, Mich.
T. J. Shellhorn, *M. M. & C. B.*.Hancock, Mich.
Minneapolis, Lyndale & Minnetonka Ry.
3 g. 20 miles 4 motors 1 lo. 35 cars.
William McCrory, *Man*.....Minneapolis, Minn.
T. W. Heintzelman, *M. M*.. Minneapolis, Minn.
Minneapolis & St. L. Ry. 4-8½ g. 425 m. 69 lo. 2,046 c.
T. E. Clarke, *Supt*..........Minneapolis, Minn.
Geo. F. Wilson, *Supt. of M.* Minneapolis, Minn.
Mississippi, Terre Aux Boeufs & Lake R. R.
29 miles. In progress.
M. R. Spelman, *Supt*........New Orleans, La.
Mississippi & Tenn. R. R. 4-8½ g. 101 m. 12 lo. 194 c.
M. Burke, *Gen. Supt*............Memphis, Tenn.
J. C. Ramsey, *M. M*.............Memphis, Tenn.
S. J. Bolton, *M. C. B*............Memphis, Tenn.
Missouri, Kansas & Texas Ry. (*See Mo. Pac.; (2) Div.*)
Missouri Pacific Ry. (Leased and operated lines.)
4-8½ g. 6,005 m. 697 lo. 19,748 cars.
A. A. Talmage, *Gen. Man*........St. Louis, Mo.
R. B. Lyle, *Pur. Agt*..............St. Louis, Mo.
(1), (2) and (3) Divs.:
John Hewitt, *Supt. Mach*.........St. Louis, Mo.
John Hodge, *Supt. Car Dep*.......St. Louis, Mo.
(4), (5) and (6) Divs.:
O. A. Haynes, *S. M. P. & M*.....Marshall, Tex.
H. H. Sessions, *M. C. B*...........St. Louis, Mo.
(1) Missouri Pacific Ry. 1,025 m. 152 lo. 4,813 cars.
A. M. Hager, *Supt*..................Sedalia, Mo.
Le Roy Bartlett, *M. M*...........St. Louis, Mo.
E. Taylor, *M. M*....................Sedalia, Mo.
W'n Div.: W. W. Fagan, *Supt*......Atchison, Kan.
(2) Mo., Kan. & Tex. Ry. 1,308 m. 140 lo. 4,248 cars.
S. Irvin, *Asst. Supt. Car Dep*.......Sedalia, Mo.
J. B. Vandyne, *Supt*..............Parsons, Kan.
J. W. Haines, *M. M*................Parsons, Kan.
(3) Central Branch Un. Pac. R. R. 388 m. 30 lo. 601 c.
W. W. Fagan, *Supt*...............Atchison, Kan.
H. V. Faries, *M. M*...............Atchison, Kan.
J. W. Blackburn, *A. Supt. Car D.*.Atchison, Kan.
(4) St. L., I. Mt. & So'n Ry. 909 m. 141 lo. 4,839 c.
Wm. Kerrigan, *Supt*...............St. Louis, Mo.
St. Louis Div.: W. H. Harris, *M. M.*.De Soto, Mo.
Ark. Div.: J. J. Frey, *Asst. Supt.* Little Rock, Ark.
R. M. Richardson, *M. M*.....Little Rock, Ark.
(5) Intern'l & Gr. No'n R. R. 891 m. 74 lo. 1,597 c.
Jos. Herrin, *Supt*.................Palestine, Tex.
O. H. Johnson, *M. M*..............Palestine, Tex.
(6) Texas & Pacific Ry. 1,489 m. 143 lo. 3,438 c.
Warder Cumming, *Supt*.........Marshall, Tex.
Eastern, New Or. & Trans Continental Divs.:
J. Williams, *Supt*...............Marshall, Tex.
Perry Stevens, *M. M*............Marshall, Tex.
E. R. Smith, *M. M. & C. B.*..New Orleans, La.
Rio Gr. Div.: J. C. Barber, *Supt.* Big Springs, Tex.
Wm. Foley, *M. M*.............Big Springs, Tex.
Mobile & Ala. Grand Trunk R. R. 5 g. 59 m. 2 lo. 23 c.
Wm. H. Pratt, *Trustee*................Mobile, Ala.
Mobile & Girard R. R. 5 g. 84 m. 7 lo. 112 cars.
W. L. Clark, *Gen. Supt*..........Columbus, Ga.
J. C. Albrecht, *M. M*...........Columbus, Ga.
A. J. Nix, *M. C. B*................Columbus, Ga.
Mobile & Montgomery Ry. (*See Louis. & Nash.*)
Mobile & Northwestern R. R. 3 g. 31 m. 2 lo. 16 c.
Thomas T. A. Lyon, *Pres*......Glendale, Miss.
Mobile & Ohio R. R. 5 g. 528 m. 75 lo. 1,353 cars.
G. Jordan, *V.-Pr. & Gen. Man*.....Mobile, Ala.
F. Jordan, *Pur. Agt*..................Mobile, Ala.
M. T. Carson, *Gen. M. M*..........Whistler, Ala.
J. T. Booth, *M. C. B*..............Whistler, Ala.
So'n Div.: J. G. Motley, *Supt*...... Mobile, Ala.
John Fitzgerald, *M. M*..........Macon, Miss.
No'n Div.: E. S. Hosford, *Supt*... Jackson, Tenn.
M. M..............Jackson, Tenn.
Mobile & Spring Hill R. R. 5 g. 8 m. 1 lo. 16 cars.
F. Ingate, *Supt*..........................Mobile, Ala.
Moline & Southeastern R. R. 3-6 g. 8 m. 2 lo. 26 c.
R. Battersly, *Gen. Man*.........Coal Valley, Ill.
Mont Alto R. R. 4-9 g. 21 m. 2 lo. 8 cars.
G. B. Wiestling, *Supt. & P. A*....Mont Alto, Pa.
Montgomery & Eufaula Ry. (*See Cen. of Ga.*)
Montgomery Southern Ry. 3 g. 20 m. 1 lo. 15 cars.
S. D. Hubbard, Jr., *Gen. Man.* Montgomery, Ala.
Montour R. R. 4-8½ g. 12 m. 2 lo. 130 cars.
C. R. Brown, *Supt. & Pur. Agt*...Imperial, Pa.
Henry Newman, *M. C. B*..........Imperial, Pa.
Montpelier & Wells Riv. R. R. 4-8½ g. 38 m. 3 lo. 86c.
W. A. Stowell, *Supt*.............Montpelier, Vt.
Montreal, Portland & Boston Ry. (*See Passumpsic.*)
Montreal & Sorel Ry. 4-8½ g. 47 m. 3 lo. 35 c.
C. N. Armstrong, *G. M. & Pur. Agt.* Sorel, Que.
J. F. Armstrong, *Gen. Supt*..........Sorel, Que.
G. W. Pangborn, *M. M*...............Sorel, Que.
Montrose Ry. 3 g. 28 m. 3 lo. 24 cars.
T. G. Walter, *Gen. Supt*... Tunkhannock, Pa.
Morgan's Louis. & Tex. R. R. 4-8½ g. 266 m. 44 l. 885 c.
J. Kruttschnitt, *Supt*.........New Orleans, La.
C. Trumpy, *Pur. Agt*..........New Orleans, La.
N. Tilton, *M. M*.....................Algiers, La.
Wm. O'Brien, *M. C. B*................Algiers, La.
Mount Washington R. R. 5-3 g. 3 m. 6 lo. 6 cars.
Walter Aiken, *Gen. Man*..........Franklin, N. H.
Muncy Creek Ry. (*See Wmspt. & No. Br.*)

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Nantasket Beach R. R. 4-8½ g. 6 m. 5 lo. 25 c.
George L. Keyes, *Gen. Supt*......Boston, Mass.
Nantucket R. R. 3 g. 4 m. 1 lo. 5 cars.
Philip H. Folger, *Supt*..............Boston, Mass.
Napanee, Tamworth & Quebec Ry. In progress.
Ed. W. Rathbun, *Man. Dir*....Deseronto, Ont.
R. A. Carter, *Supt*...............Deseronto, Ont.
Narragansett Pier R. R. 4-8½ g. 8 m. 2 lo. 11 c.
G. T. Lanphear, *Supt. & Pur. Agt.* Peacedale, R. I.
Nashua & Rochester R. R. (*See Wor. & Nash.*)
Nashville, Chattanooga & St. Louis Ry.
5 g. 539 miles 87 lo. 1,979 cars.
J. W. Thomas, *G. Man. & P. Agt.* Nashville, Tenn.
M. J. C. Wrenne, *Supt*..........Nashville, Tenn.
James Cullen, *M. M. & C. B*..Nashville, Tenn.
Nashville & Florence R. R. 5 g. 20 m.
J. T. Craik, *Supt*...............Columbia, Tenn.
Natchez, Jackson & Col. R. R. 3-6 g. 100 m. 7 lo. 72 c.
E. D. Frost, *Gen. Supt*............Natchez, Miss.
National Car Company. 4,000 freight cars.
L. Millis, *Pres*...........................Boston, Mass.
F. Stewart Stranahan, *Sec. & Tr.* St. Albans, Vt.
John B. Fletcher, *Supt*.......St. Albans, Vt.
Naugatuck R. R., 4-8½ g. 61 miles, 16 lo. 384 cars.
Geo. W. Beach, *Supt*..............Waterbury, Ct.
H. A. Bishop, *Pur. Agt*.
Henry Hanford, *For. M. Shop*. Bridgeport, Ct.
Geo. W. Gray, *For. Car Shop*...Bridgeport, Ct.
Nebraska, Topeka, Iola & Memphis R. R. 4-8½ g. 16 m.
H. M. Clarke, *Gen. Man*...........Girard, Kan.
C. H. Malin, *Gen. Supt*............Girard, Kan.
Nevada Central R. R. (*See Union Pac.; (7) Div.*)
Nevada County N. G. R. R. 3 g. 23 m. 3 lo. 46 cars.
John F. Kidder, *Supt*.........Grass Valley, Cal.
Jas. McCormick, *M. M. & C. B.* Grass Valley, Cal.
Nevada & Oregon R. R. 3 g. 30 m. 25 cars.
D. W. Balch, *Supt*...................Reno, Nev.
New Brunswick Ry. 4-8½ g. 419 m. 20 lo. 357 cars.
E. R. Burpee, *Gen. Man*......Woodstock, N. B.
Jesse Mathews, *M. M*...............Gibson, N. B.
T. N. Burpee, *M. C. B*..............Gibson, N. B.
J. J. Seely, *Pur. Agt*................ Gibson, N. B.
Thos. Armstrong, *M. M*... St. Andrew's, N. B.
G. Houlton, *M. C. B*.........St. Andrew's, N. B.
New Brunswick & Can. Ry. (*See New Brun.*)
New Canaan R. R. 4-8½ g. 8 m. 2 lo. 4 cars.
Wm. St John, *Supt*............New Canaan, Ct.
New Castle R. R. 3-6 g. 5 m. 2 lo. 76 cars.
Geo. Pearson, *Gen. Man*.......New Castle, Pa.
New Castle & Beaver Valley R. R. (*See Penna. Co.*)
New Haven & Derby R. R. 4-8½ g. 13 m. 4 lo. 70 c.
E. S. Quintard, *Supt*...........New Haven, Conn.
J. M. Whitlock, *M. M. & C. B.* New Haven, Conn.
New Haven & No'mpton. 4-8½ g. 170 m. 27 lo. 598 c.
S. B. Opdyke, Jr., *Supt*...........New Haven, Ct.
C. N. Yeamans, *Pur. Agt*........New Haven, Ct.
Henry Fox, *M. M*..................New Haven, Ct.
John Sweeny, *M. C. B*...........New Haven, Ct.
New Jersey & New York Ry. 4-8½ g. 37 m. 6 lo. 40 c.
J. D. Hasbrouck, *Gen. Man* Jersey City, N. J.
J. S. Drake, *Supt. & M. M*.......Hillsdale, N. J.
L. B. Van Wagonen, *M. C. B*....Hillsdale, N. J.
N. J. Southern Ry. (*See Phil. & Read.; N. J. So. Div.*)
New London Northern R. R. (*See Central Ver.*)
New Orleans Pacific Ry. (*See Mo. Pac.; (6) Div.*)
New Orleans & Carrollton R. R.
4-8½ g. 15 m. 12 lo. 79 cars.
C. V. Haile, *Supt*..............New Orleans, La.
John Dahmer, *M. M*...........New Orleans, La.
Jas. Thorn, *M. C. B*............New Orleans, La.
New Orleans & Mobile R. R. (*See Louis. & Nash.*)
N. O. & Northeastern R. R. (*See Cin., N. O. & Tex. Pac.*)
New Orleans & Selma R. R. 5 g. 21 m. 1 lo. 8 cars.
L. B. Schofield, Supt.....................Selma, Ala.
N. Y. Central & Hudson River R. R.
4-8½ g. 983 m. 676 lo. 25,161 cars.
J. M. Toucey, *Gen. Supt*...... New York, N. Y.
R. C. Moore, *Pur. Agt*......... New York, N. Y.
Wm. Buchanan, *Supt. M. P*... New York, N. Y.
L. Garey, *Supt. Car Dept*..... New York, N. Y.
N. Y. & Har. Div.: C. M. Bissell, *Supt.* do.
P. McQ. Gibson, *M. M*.........New York, N. Y.
C. E. Garey, *M. C. B*..........Morrisania, N. Y.
Hud. Riv. Div.: C. M. Bissell, *Supt.* N. York, N. Y.
Peter Smith, *M. C. B*..........New York, N. Y.
E'n Div.: Zenas C. Priest, *Supt*......Utica, N. Y.
John Ortton, *M. M*........West Albany, N. Y.
D. Hoit, *M. C. B*.......... West Albany, N. Y.
W'n Div.: Geo. H. Burrows, *Supt.* Rochester, N. Y.
S. L. White, *M. M*.............Syracuse, N. Y.
Amos Gould, *M. M*..............E. Buffalo, N. Y.
E. A. Olmstead, *M. C. B*....E. Buffalo, N. Y.
C. H. Burchard, *M. C. B*..E. Rochester, N. Y.
Rd. Donaby, *M. C. B*....Niagara Falls, N. Y.
N. Y. Chic. & St. L. Ry. 4-8½ g. 513 m. 115 lo. 4,838 c.
Lewis Williams, *Gen. Man*...... Cleveland, O.
Jno. Mackenzie, *Supt. M. P*......Cleveland, O.
Eas'tn Div.: G. H. Kimball, *Supt*...Cleveland, O.
E. A. Miller, *M. M*..................Conneaut, O.
West'n Div.: A. H. Evans, *Act. Supt*..Chicago, Ill.
Jas. Eckford, *M. M*..................Bellevue, O.
New York City & Northern. 4-8½ g. 54 m. 17 lo. 368 c.
Frank S. Gannon, *Gen. Supt.* High Bridge, N. Y.
Theo. Wheeler, *M. M*.........High Bridge, N. Y.
New York, Lackawanna & W'n Ry. (*See Del., L. & W.*)
New York, Lake Erie & Western R. R.
V. Pr. & G. Man..New York, N. Y.
(1) N. Y., L. E. & W. Div.: 4-8½ g. 1,073 m. 576 lo. 30,553 c.
E. S. Bowen, *Gen. Supt*.........New York, N. Y.
J. A. Hardenburgh, *Pur. Agt.* New York, N. Y.
F. M. Wilder, *Supt. M. P. & M*...Susqueh'a, Pa.
E'n Div.: E. O. Hill, *Supt*.......Jersey City, N. J.
J. H. Vreeland, *M. M*......... Jersey City, N. J.
J. N. Mileham, *M. C. B*......Jersey City, N. J.
Del. Div.: W. J. Murphy, *Supt*..Port Jervis, N. Y.
J. Van Vechten, *M. M. & C. B.* Pt. Jervis, N. Y.
Susq. Div.: J. Jolls, *Supt*..............Elmira, N. Y.
V. Blackburn, *M. M*........Susquehanna, Pa.
D. B. Goodell, *M. C. B*...........Elmira, N. Y.
Buf. & R. Divs.: Chas. Neilson, *Supt.*; and
G. B. Ross, *M. M*...................Buffalo, N. Y.
M. Wilder, *M. C. B*................Buffalo, N. Y.
B. & S.-W. Div.: C. A. Brunn, *Supt* do.
W'n Div.: W. B. Coffin, *Supt*..Hornellsville, N. Y.
Geo. H. Griggs, *M. M*......Hornellsville, N. Y.
N. Y. & Greenwood L. Ry. 4-8½ g. 44 m. 8 lo. 53 c.
Stephen Smith, *Supt*.............Jersey City, N. J.
G. A. Hill, *M. M*....................Pompton, N. J.
(2) N. Y., Pa & O. Div.: 4-8½ g. 565 m. 221 lo. 7,794 c.
J. M. Ferris, *Gen. Supt*..........Cleveland, Ohio.
J. H. Holway, *Pur. Agt*........Cleveland, Ohio.
Wm. Fuller, *Gen. M. M. & C. B*...Cleveland, O.
S. V. Smith, *Asst. Gen. M. C. B*....Kent, Ohio.
E'n Div.: A. L. Dunbar, *Supt*.......Meadville, Pa.
J. A. Cooper, *M. M*..................Meadville, Pa.
D. S. Dockstader, *M. C. Rep*...Meadville, Pa.
W'n Div.: T. A. Phillips, *Supt*..........Galion, O.
Wm Hill, *M. M*................................Galion, O.
J. W. Holmes, *For. Car Rep*.........Galion, O.
Geo. Wilson, *For. Car Rep*.... Dayton, Ohio.
Maho'g Div.: N. F. Wood, *Supt*......Cleveland, O.
N. Wright, *M. M*...................Cleveland, O.
C. N. Thorp, *M. C. Rep*.........Cleveland, O.
New York, New Haven & Hartford R. R.
4-8½ g. 203 m. 123 lo. 2,768 cars.
E. M. Reed, *V. P. & Gen. Man*..New Haven, Ct.
R. N. Dowd, *Pur. Agt*.............New Haven, Ct.
N. Y. & N. H. Div.: W. H. Stevenson, *Supt*...N. Y.
Shore Line and Air Line Divs.:
O. M. Shepard, *Supt*.......... N. Haven, Ct.
H. Kettendorf, *Supt. M. P*...New Haven, Ct.
Jas. Denver, *M. C. B*..........New Haven, Ct.
Hart. Div.: C. S. Davidson, *Supt*....Hartford, Ct.
John Henny, Jr., *Supt. M. P. & M. C. B*.... do.
N. Y., Ontario & Western Ry. (*See N. Y., W. Sh. & Buf.*)
New York, Pittsburgh & Chicago. 20 m. 2 lo. 32 c.
Geo. W. Dixon, *Supt*.......... New Galilee, Pa.
N. Y., Pennsylvania & Ohio R. R. (*See N. Y., L. E. & W.*)
New York, Philadelphia & Norfolk R. R.
4-8½ g. 10 m. 1 lo. 4 cars.
J. L. Bates, *Supt*....... Pocomoke City, Md.
New York, Providence & Boston R. R.
4-8½ g. 83 m. 29 lo. 430 cars.
J. B. Gardner, *Supt*............Providence, R. I.
Giles F. Ward, *Pur. Agt*......Stonington, Conn.
J. H. Anderson, *M. M. & C. B.* Providence, R. I.
N. Y., Susquehanna & W'n. 4-9 g. 147 m. 28 lo. 991 c.
F. A. Potts, *Gen. Man*.........New York, N. Y.
C. D. McKelvey, *Asst. Supt*. Jersey City, N. J.
C. T. Demarest, *Pur. Agt*.....New York, N. Y.
W. C. Ennis, *M. M. & C. B*...Wortendyke, N. J.
New York, Texas & Mexican Ry.
4-8½ g. 92 m. 6 lo. 95 cars.
P. Moneta, *Gen. Man*..............Victoria, Tex.
C. L. Leslie, *Gen. Supt*.........Rosenberg, Tex.
J. G. Conlon, *M. M*................Victoria, Tex.
New York, West Shore & Buffalo and
New York, Ontario & Western Rys.
4-8½ g. 850 m. 98 lo. 2,907 c.
J. D. Layng, *Gen. Man*........New York, N. Y.
J. E. Childs, *Gen. Supt*........New York, N. Y.
P. S. Bemis, *Pur. Agt*..........New York, N. Y.
R. H. Soule, *Supt. M. P*.......New York, N. Y.
So. Div.: C. W. Bradley, *Supt*..New York, N. Y.
Harry Linn, *M. M*.
Mohawk Div.: H. W. Garner, *Supt.* Syracuse, N. Y.
Buff. Div.: F. E. Merrill, *Supt*......Buffalo, N. Y.
George W. West, *M. M*..........Syracuse, N. Y.
Wm. J. McMichael, *M. C. B*....Syracuse, N. Y.
N. Y. Woodhaven & Rockaway R. R. (*See Long Is.*)
N. Y. & Greenwood Lake Ry. (*See N. Y., L. E. & W.*)
N. Y. & Manhattan Beach Ry. (*See Long Island.*)
New York & Long Branch R. R. (*See Phil. & Read.*)
New York & New England R. R.
4-8½ g. 478 m. 127 lo. 3,399 cars.
S. M. Felton, Jr., *Gen. Man*......Boston, Mass.
W. W. McKim, *Pur. Agt*.........Boston, Mass.
Ross Kells, *Supt. M. P. & M*......Boston, Mass.
W. G. Tabor, *M. M*..................Boston, Mass.
H. E. Barker, *Gen. Fore*........Norwood, Mass.
East Div: W. H. Turner, *Supt*......Boston, Mass.
Nor. Div.: P. St. M. Andrews, *Supt*...Norwich, Ct.
W. A. Stone, *M. M*..................Norwich, Ct.
Prov. Div.: L. W. Palmer, *Supt*..Providence, R. I.
Hfd. Div.: E. Holbrook, *Supt*.......Hartford, Ct.
E. M. Humstone, *M. M*...........Hartford, Ct.
D. F. Andregg, *For. C. Dept*....Hartford, Ct.
New York & Sea Beach R. R. 4-8½ g. 6 m. 4 lo. 40 c.
C. W. Douglass, *Gen. Man*...Bay Ridge, N. Y.
W. A. Sheldon, *Supt*.........Bay Ridge, N. Y.
Newark, Somerset & Straitsville R. R. (*See B. & O.*)
Newburg, Dutchess & Conn. R. R. 4-8½ g. 59 miles.
C. L. Kimball, *Gen. Supt*.....Matteawan, N. Y.
W. G. Van Buskirk, *M. M. & C. B.*,
Dutchess Junction, N. Y.
Newfoundland Ry. 3-6 g. 45 m. 7 lo. 41 c.
C. X. Hobbs, *Gen. Man*.........St. John's, N'f'd.
Norfolk Southern R. R. 4-8½ g. 95 m. 11 lo. 182 c.
M. K. King, *Gen. Man. & Pur. Agt.* Norfolk, Va.
J. S. Whitworth, *M. M. & C. B*....Norfolk, Va.
Norfolk & Ocean View Narrow Gauge R. R.
3 g. 8 m. 2 lo. 9 cars.
W. H. Taylor, *Pres*.....................Norfolk, Va.
Norfolk & Western R. R. (*See Shenandoah Val.*)
North-Eastern R. R. of Ga. 5 g. 72 m. 2 lo. 20 cars.
H. R. Bernard, *Supt*......................Athens, Ga.
North-Eastern R. R. (S. C.) (*See Wil. & Wel.*)
North Pacific Coast R. R. 3 g. 84 m. 12 lo. 320 cars.
David Nye, *Gen. Supt*..........San Rafael, Cal.
W. F. Russell, *Pur. Agt*....San Francisco, Cal.
J. Fowler, *M. M*...................Saucelito, Cal.
North Shore Ry. 4-8½ g. 201 m. 36 lo. 993 c.
W. Wainwright, *Gen. Man*....... Quebec, Can.
A. Davis, *Supt. & M. M*...........Quebec, Can.
Northern (N. H.), and Concord & Claremont Rys.
4-8½ g. 173 m. 25 lo. 569 cars.
Geo. E. Todd, *Supt*..............Concord, N. H.
M. M. & C. B. & Pur. Agt.. do.
Northern (N. J.) R. R. (*See N. Y., L. E. & W'n.*)
Northern Central Ry. (*See Penna. R. R. (6) Div.*)
North'n Pacific R. R. 4-8½ g. 2,207 m. 391 lo. 9,897 c.
T F. Oakes, *Gen. Man*.......... St. Paul, Minn.
John H. Ames, *Gen. Pur. Agt*..St. Paul, Minn.
Geo. W. Cushing, *Supt. M. P., M. & R. S.* do.
(1) E'n Div.: J. T. Odell, *A. Gen. Man.* St. Paul, Minn.
H. J. Small, *A. S. Mach*.......Brainerd, Minn.
1st Gr. Div.: M. C. Kimberly, *Supt.* St. Paul, Minn.
Frank Howard, *M. C. B*......Brainerd, Minn.
2d Grand Div.: J. M. Graham, *Supt*..Fargo, Dak.
C. C. Quinn, *M. M*....................Fargo, Dak.
3d Gd. Div.: D. R. Taylor, *Supt*....Mandan, Dak.
E. F. Doran, *M. M*..................Mandan, Dak.
4th Gr. Div.: S. R. Ainslie, *Supt*..Glendive, Mont.
S. L. Bean, *M. M*..................Glendive, Mont.
G. S. La Rue, *M. M*................Billings, Mont.
(2) W'n Div.: J. M. Buckley, *Asst. Gen. Man.*; and
Otis Sprague, *Supt*.......New Tacoma, W. T.
H. D. Sanborn, *Pur. Agt*......Portland, Ore.
W. T. Small, *A. S. Mach*......Sprague, W. T.
Robt. Walker, *M. C. B*..........Sprague, W. T.
F. C. Ford, *M. M*..........New Tacoma, W. T.
S. Wishart, *M. C. B*......New Tacoma, W. T.
Mo. Div.: B. F. Matthias, *Supt*....Bismark, Dak.
Pend d'Ore Div.: F. F. Griffin, *Supt.* Sprague, W. T.
J. Evans, *M. M*........................Sprague, W. T.
Northern & North-W'n Rys. 4-8½ g. 378 m. 50 lo. 1,195 c.
James Webster, *Supt*..............Toronto, Can.
W. C. Schreeber, *Pur. Agt*.......Toronto, Can.
P. Clarke *M. M*.........................Toronto, Can.

O

Ogdensburg & Lake Champlain R. R.
4-8½ g. 122 m. 33 lo. 1,694 cars.
A. A. Gaddis, *Gen. Man*......Ogdensburg, N. Y.
E. B. Burnham, *Pur. Agt*...Ogdensburg, N. Y.
Abr. Klohs, *Supt. & M. M*........Malone, N. Y.
J. N. Brown, *M. C. B*...............Malone, N. Y.
Ohio Central R. R. 4-8½ g. 325 m. 46 lo. 4,760 cars.
John E. Martin, *Gen. Man*............Toledo, O.
T. M. Peelar, *Supt*....................Bucyrus, O.
F. W. Stewart, *Pur. Agt*................Toledo, O.
J. B. Morgan, *M. M. & C. B*........Bucyrus, O.
Ohio Southern R. R. (*See Ind., Bloom. & W'n.*)
Ohio & Mississippi Ry. 4-9 g. 616 m. 113 lo. 2,501 cars.
W. W. Peabody, *Gen. Man*......Cincinnati, O.
G. E. Atwood, *Pur. Agt*..........Cincinnati, O.
J. H. Setchel, *Gen. M. M*.........Cincinnati, O.
Cin. Div.: C. B. Cole, *Supt*..........Seymour, Ind.
John Thumser, *M. M*..........Seymour, Ind.
J. P. Coulter, *M. C. B*..............Aurora, Ind.
Arthur Donaldson, *M. M*......Vincennes, Ind.
St. L. & Sp. Div.: C. M. Stanton, *Supt.* St. Louis, Mo.
J. W. Stokes, *M. M.* (Spring. Div.)..Pana, Ill.
Louis. Div.: C. B. Cole, *Supt*.....Louisville, Ky.
Oil City & Chicago R. R. (*See Buff., N. Y. & Phil.*)
Oil City & Ridgway R. R. 4-8½ g. 6 m. 1 lo. 43 cars.
A. F. Kent, *Gen. Man*.....................Oil City, Pa.
Old Colony R. R. 4-8½ g. 470 m. 115 lo. 3,124 cars.
J. R. Kendrick, *Gen. Man*.............Boston, Mass.
Main Li. Div.: J. H. French, *Supt*...Boston, Mass.
Berkley Powell, *M. M*................Boston, Mass.
R. W. Husted, *Pur. Agt*...............Boston, Mass.
Jas. N. Lauder, *Supt. M. P*.......Boston, Mass.
Sam'l Stevens, *M. C. B*..............Boston, Mass.
Cape Cod Div.: C. H. Nye, *Supt*..Hyannis, Mass.
No. Div.: S. A. Webber, *Supt*....Fitchburg, Mass.
Geo. W. Reynolds, *M. M*......Taunton, Mass.
Sam. Stevens *M. C. B*............ Taunton, Mass.

Goodell & Waters

PHILADELPHIA, PA.

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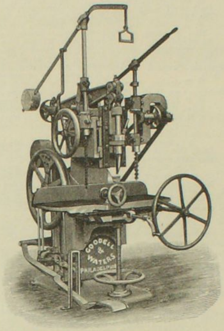

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OUR **KEYSTONE** FLOORING MACHINE has now an established reputation as a special machine for rapid and good work.

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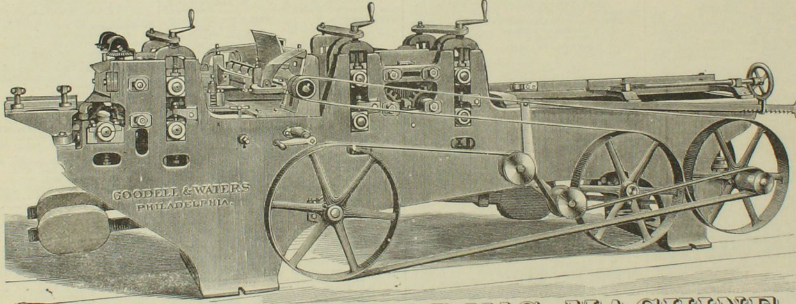
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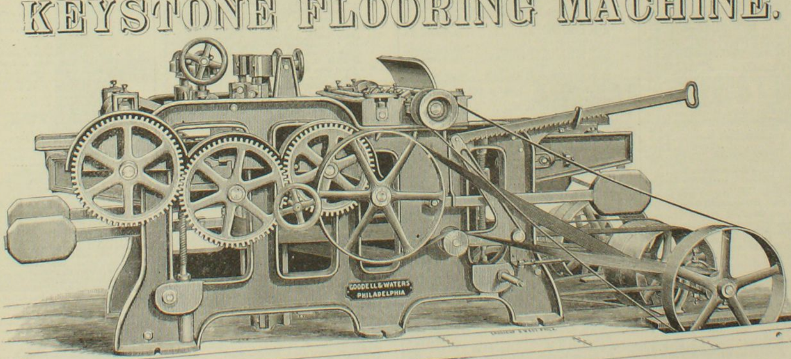
KEYSTONE FLOORING MACHINE.



CAR SILL PLANER AND DOUBLE-SURFACER AND JOINTER.

OUR ASSORTMENT OF GENERAL MACHINERY is larger than ever and continually increasing in variety. It now embraces first-class machines for bandsawing, slitting and cut-off sawing, resawing and scroll sawing, jointing, grooving, molding, tenoning, turning, mortising, shaping, etc. with requisite shafting, pulleys, hangers, arbors, knives, cutters, chisels, and fixtures for railway and street car builders, ship joiners, makers of heavy and light agricultural implements, pianos, organs, clock cases, furniture, boxes, toys, modern wainscot and hard wood finish.

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GOODELL & WATERS,

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Oregon Ry. & Navigation Co.
3 & 4-8½ g. 531 m. 52 lo. 1,288 cars.
C. H. Prescott, *Manager*..........Portland, Ore.
F. T. Dodge, *Supt.* (Riv. Div.)....Portland, Ore.
H. S. Rowe, *Supt.* (Ry Div.).......Portland, Ore.
J. M. Drake, *Pur. Agt*..........Portland, Ore.
C. C. Hobart, *Gen. M. M*.......The Dalles, Ore.
Chas. A. Phipps, *M. C. B*.....The Dalles, Ore.
N. G. Div.: Wm. Reed, *Man*.... Portland, Ore.
James Walch, *M. M*..............Portland, Ore.
Oregon & California R. R. 4-8½ g. 333 m. 23 lo. 576 c.
R. Koehler, *Act. Man*............Portland, Ore.
J. Brandt, *Gen. Supt*............Portland, Ore.
A. Brandt, *M. M*..................Portland, Ore.
Owensboro & Nashville R. R. 5 g. 44 m. 3 lo. 70 c.
O. M. Dunn, *Supt*..............Owensboro, Ky.
H. M. Gabel, *M. M. & C. B*....Owensboro, Ky.
Oxford & Henderson R. R. 4-8½ g. 13 m. 2 lo. 11 c.
James A. White, *Gen. Supt*...Henderson, N. C.
James E. Lawrence, *M. M*... Henderson, N. C.

P

Pacific Coast Ry. 3 g. 64 m.
J. M. Fillmore, *Manager*. San Luis Obispo, Cal.
W. H. Masterman, *M. M. & C. B.* do.
Painesville & Youngstown Ry. 3 g. 65 m. 7 lo. 319 c.
R. K. Paige, *Rec. & Man*.........Painesville, O.
J. A. Newcome, *Supt*............Painesville, O.
E. B. Baldwin, *M. M*............Painesville O.
Panama R. R. 5 g. 48 m. 16 lo. 608 cars.
H. A. Woods, *Supt*......... Aspinwall, U. S. Col.
E. Z. Penfield, *Pur. Agt*.......New York, N. Y.
D. P. Wright, *M. M*........Aspinwall, U. S. Col.
Passumpsic R. R. 4-8½ g. 147 m. 28 lo. 1,101 cars.
E. Raymond, *Pres. & Pur. Agt*.. Boston, Mass.
H. E. Folsom, *Supt*...........Lyndonville, Vt.
L. L. Brigham, *M. M*........ . Lyndonville, Vt.
L. F. Woodard, *M. C. B* ......Lyndonville, Vt.
Paulding & Cecil Railway. 4-8½ g. 7 m. 3 lo. 28 c.
S. Frank Eagle, *Pres*.......................Cecil, O.
Paw Paw and Toledo & South Haven R. Rds.
3 g. 19 m. 2 lo. 11 cars.
John Ihling, *Supt*.................Lawton, Mich.
Peach Bottom R. R. 3 g. 55 m. 6 lo. 52 cars.
G. R. Dickey, *Supt. & Pur. Agt*......York, Pa.
E. H. Williams, *M. C. B*...............York, Pa.
W. P. Kirk, *M. M*...................Oxford, Pa.
Pemigewasset Valley R. R. 4-8½ g. 21 m. 2 lo. 127c.
J. Thomas Vose, *Pres*........ ...Boston, Mass.
Pennsylvania Co.'s (5) Roads.
4-9 g. 3,222 m. 920 lo. 32,809 cars.
Gen. Divs. (1), (2), (3), (4) and (5).
Wm. A. Baldwin, *Gen. Man*.....Pittsburg, Pa.
John Thomas, *Gen. Supt*...... Pittsburg, Pa.
Wm. Mullins, *Gen. Pur. Agt*......Pittsburg, Pa.
Joseph Wood, *Supt. M. P*.... .Fort Wayne, Ind.
(1) Pittsburg, Ft. Wayne & Chicago Ry.
4-9 g. 468 m. 288 lo. 8,023 cars.
E'n Div.: A. B. Starr, *Supt*.......Allegheny, Pa.
Geo. J. Parkin, *M. M*..... ....Allegheny, Pa.
D. M. Peppard, *M. M*........ . Crestline, O.
W'n Div.: C. D. Law, *Supt*.....Ft. Wayne, Ind.
F. D. Casanave, *M. M*.........Ft. Wayne, Ind.
A. H. Somers, *Gen. For. Shops*...Chicago, Ill.
(2) Ashtabula & Pittsburg, and
(3) Erie & Pittsburg R. Rds. 221 m. 29 lo. 1,362 c.
John M. Kimball, *Supt*..Lawrence Junc., Pa.
J. A. Wood, *Gen. For. Shops*........Erie, Pa.
(4) Cleveland & Pittsb'g R. R. 225 m. 97 lo. 3,534 c.
R. F. Smith, *Asst. Man*.... .....Cleveland, O.
Philip Bruner, *Supt*.............Wellsville, O.
W. F. Beardsley, *Mast. of Mach*. Wellsville, O.
(5) No-W'n Ohio Ry.: J. S. Morris, *Supt*...Toledo, O.
Pennsylvania R. R. Co.'s Roads. (7 Gen. Divs.)
4-9 g. 3,158 m. 1,459 loco. 66,816 cars.
Chas. E. Pugh, *Gen Man*......Philadelphia, Pa.
Enoch Lewis, *Pur. Agt*.......Philadelphia, Pa.
John Reilly, *Supt. Trans*......Philadelphia, Pa.
T. N. Ely, *Gen S. M. P*..............Altoona, Pa.
(1) Pennsylvania R. R. Divs.
4-9 g. 1,139 m. 709 lo. 48,087 cars.
S. M. Prevost, *Gen Supt*. ....Altoona, Pa.
Frank L. Sheppard, *Supt. M. P*..Altoona, Pa.
G. W. Strattan, *M. M*.. ....Altoona, Pa.
Jno. P. Levan, *Gen. Fore*... ....Altoona, Pa.
Phila. Div.: Tho. Gucker, *Supt*. Philadelphia, Pa.
H. D. Garrett, *M. M*....W. Philadelphia, Pa.
I. W. Van Houten, *Gen. For*....W. Phila., Pa.
Mid. Div.: O. E. McClellan, *Supt*. Harrisburg, Pa.
E. L. Caum, *M. M*............Harrisburg, Pa.
Samuel W. Myers, *Gen. For*. Harrisburg, Pa.
Altoona Div.: Jas. Reed, *Supt*.......Altoona, Pa.
Pitts. Div.: Robert Pitcairn, *Supt*....Pittsburg, Pa.
D. O. Shaver, *M. M*.............Pittsburg, Pa.
J. G. Stewart, *Gen. For*........Pittsburg, Pa.
W. Pa. Div.: A. P. Kirtland, *Supt*. Blairsville, Pa.
Wm. B. Norris, *M. M*..........Blairsville, Pa.
M. H. Fails, *Gen. For*..........Blairsville, Pa.
Fred. Div.: J. B. Hutchinson, *Supt*.....York, Pa.
Tyrone Div.: S. S. Blair, *Supt*........Tyrone, Pa.
Lew. Div.: Wm. M. Phillips, *Supt*. Lewistown, Pa.
Bed. Div.: R. L. Holliday, *Supt*......Bedford, Pa.
Monong. Div.: David M. Watt, *Supt*. Pittsburg, Pa.
Wm. Lininger, *M. M*............Pittsburg, Pa.
(2) United R. Rs of N. J. Divs. 575 m. 305 lo. 4,962 c.
F. Wolcott Jackson, *Gen. St*. Jersey City, N. J.
H. S. Hayward, *Supt. M. P*...Jersey City, N. J.
David H. Baker, *Gen. For*...Jersey City, N. J.
N.Y. Div.: Robt. E. Pettit, *Supt*. Jersey City, N. J.
L. A. Bosdevex, *M. M*. ..Jersey City, N. J.
E. F. Bosdevex, *Gen. For*..Jersey City, N. J.
Belv. Div.: J. A. Anderson, *Supt*. Lambertv., N. J.
R. McDowell, *M. M*.......Lambertville, N. J.
Amboy Div.: I. S. Buckalew, *Supt*. Camden, N. J.
Thos. Kerr, *M. M*....... ....So. Amboy, N. J.
P. S. Bogart, *Gen. For*......So. Amboy, N. J.
Camden & At. Rd.: W. N. Bannard, *Supt*., and
Rufus Hill, *M. M*.. ....Camden, N. J.
Samuel Wills, *M. C. B* ....Camden, N. J.
(3) West Jersey R. R. 4-9 g. 186 m. 25 lo. 524 cars.
Joseph Crawford, *Gen. Supt* ....Camden, N. J.
W McAllister, *M. M*..............Camden, N. J.
C. C. Williams, *Gen. For*........Camden, N. J.
(4) Phila., Wilm. & Balt. R.R. 386 m. 121 lo. 1,777 c.
H. F. Kenney, *Gen. Supt* ....Philadelphia, Pa.
J. M. Wallis, *S. M. P*........Philadelphia, Pa.
H. D. Gordon, *M. M*.........Wilmington, Del.
W. H. Lungren, *M. C. B*..... ..Wilmington, Del.
Cen. Div.: L. K. Lodge, *Supt*......... Media, Pa.
Del. Div.: I. N. Mills, *Supt*.....Wilmington, Del.
Mo. Div.: H. H. Carter, *Supt*..Wilmington, Del.
(5) Phila. & Erie R. R. Divs.: 418 m. 117 lo. 3,481 c.
R. Neilson, *Gen. Supt*.... ..Williamsport, Pa.
A. O. Dayton, *Supt. Mo. Po*..Williamsport, Pa.
E'n. Div.: E. B. Westfall, *Supt*. Williamsport, Pa.
Sun.H. & W. Div: A. Walter, *Supt*.; and
H. K. Stout, *M. M*.... ... .Sunbury, Pa.
Mid. Div.: Tho. A. Roberts, *Supt*.....Renova, Pa.
Wm. L. Holman, *M. M*..........Renova, Pa.
West'n Div.: J. W. Reynolds, *Supt*.....Erie, Pa.
W. T. Smith, *M. M* ....Erie, Pa.
(6) Northern Central Ry. 4-9 g. 326 m. 152 lo. 7,627 c.
Robert Neilson, *Gen. Supt*...Williamsport, Pa.
A. O. Dayton, *Supt. M. P*....Williamsport, Pa.
A. W. Sumner, *Pur. Agt*... ....Baltimore, Md.
J. M. Coale, *M. M*.................Baltimore, Md.
G. W. Demarest, *Gen. For*......Baltimore, Md.
Susq. Div.: E. B. Westfall, *Supt*. Williamsport, Pa.
Sham. Div.: A. Walter, *Supt*..... ..Sunbury, Pa.
Elm. & Can. Divs.: S. Meade, *Supt*..Elmira, N. Y.
Jas. Strode, *M. M*..... ....Elmira, N. Y.
J. C. Dyott, *Gen. For*...... ....Elmira, N. Y.
Baltimore Div.: H. W. Knapp, *Supt*. Baltimore, Md.
(7) Balt. & Pot. & Alex. & Fred. 128 m. 30 lo. 358 c.
H. F. Kenny, *Gen. Supt*.......Philadelphia, Pa.
A. W. Sumner, *Pur. Agt*... ....Baltimore, Md.
J. M. Wallis, *Supt. Mo. Po*....Philadelphia, Pa.
H. D. Gordon, *M. M* .... .Wilmington, Del.
J. Lescallett, *For. Mach. Shop*. Washington, D.C.
R. F. Downer, *For. Car Shop*. Washington, D.C.
Penn. Coal Co.'s R. R. 4-3 g. 67 m. 23 eng. 3,271 c.
J. B. Smith, *Gen. Supt*. ....Dunmore, Pa
And. Crane, *M. M*. ....Dunmore, Pa.
Geo. W. Simpson, *M. C. B*........Dunmore, Pa.
Pennsylvania, Slatington & New England R. R.
In progress. 4-8½ g. 18 m. 1 lo. 20 cars.
C. H. Stanton, *Supt* .... New York, N. Y.
Pennsylvania & Erie R. R.—Early Branch.
C. R. Early, *Gen. Supt*..........Ridgeway, Pa.
Pensacola & Atlantic R. R. 5 g. 161 m. 9 lo. 67 cars.
W. D. Chipley, *Gen. Supt*.......Pensacola, Fla.
M. J. Carroll, *M. M*............ .Pensacola, Fla.
Pensacola & Perdido R. R. 5 g. 10 m. 5 lo. 93 cars.
B. F. Simmons, *Pr. & Supt*.... Pensacola, Fla.
H. W. Simmons, *Pur. Agt*......Pensacola, Fla.
J. C. Schulte, *M. M*.............Pensacola, Fla.
People's Ry. 4-8½ g. 15 m. 2 lo. 14 cars.
W. D. Pollard, *Supt*.............Pottsville, Pa.
Peoria, Decatur & Evansville Ry.
4-8½ g. 254 m. 30 lo. 1,487 cars.
G. L. Bradbury, *Gen. Man*.... .... Peoria, Ill.
G. R. Cobleigh, *Supt. & Pur. Agt*...Peoria, Ill.
P. Reilly, *M. M*....................Mattoon, Ill.
Peoria & Farmington R. R. (*See Cen. Ia.*)
Peoria & Pekin Union Ry. 4-8½ g. 20 m. 12 lo. 106 c.
Thos. B. Burnett, *Gen. Supt. & P. A*. Peoria, Ill.
R. F. Hurd, *M. M. & C. B*.. ....Peoria, Ill.
Perkiomen R. R. 4-8½ gauge 39 miles.
D. B. Clack, *Supt*......Perkiomen Junction, Pa.
H. Boyd, *Pur. Agt*..............Norristown, Pa.
Petersburg R. R. 4-8½ g. 64 m. 10 lo. 133 cars
R. M. Sully, *Gen. Supt*..........Petersburg, Va.
L. E. Clark, *Pur. Agt*..........Petersburg, Va.
R. B. Andrews, *M. M*..... .....Petersburg, Va.
J. W. Fleming, *M. C. B*.........Petersburg, Va.
Phila., Wilmington & Balt. R. R. (*See Penna. R. R.*)
Peterborough & Hillsborough. (*See Northern, N. H.*)
Philadelphia, Newtown & New York R. R.
4-8½ g. 23 m.
W. M. Geary, *Supt*..............Norristown, Pa.
Phila. & Atlantic City Ry. 3-6 g. 55 m. 11 lo. 134 cars.
F. S. Urie, *Supt. & Pur. Agt*..Philadelphia, Pa.
John T. Keihner, *M. M*...........Camden, N. J.
E. Lippincott, *M. C. B*.... ......Camden, N. J.
Philadelphia & Erie R. R. (*See Penna. R. R.; (5) Div.*)
Philadelphia & Reading R. R. (and Branches.)
4-8½ g. 1,414 m. 855 lo. 55,619 cars.
John E. Wootten, *Gen. Man*..Philadelphia, Pa.
(1) Phila. & Read. Div.: 846 m. 539 lo. 24,606 c.
W. S. Wilson, *Pur. Agt*....Philadelphia, Pa.
Geo. Eltz, *Supt. Trans*...... ... Reading, Pa.
L. B. Paxson, *Eng. of Mach*.....Reading, Pa.
No. Pa. & Bound Brook and Bethlehem Br.:
I. A. Sweigard, *Supt*........Philadelphia, Pa.
Mahoney & Shamokin and other Brs.:
J. H. Olhausen, *Supt*..... Mahoney Plane, Pa
Catawissa & Williamsport Br.:
D. C. Reinhart, *Supt*. ......Williamsport, Pa.
Mine Hill & Schuylkill Haven Br.:
A. A. Hesser, *Supt*..............Cressona, Pa.
Schuylkill & Susquehanna and Leb. & Tre. Brs.:
H. H. Tracy, *Supt*..... ......Pine Grove, Pa.
Reading & Columbia Br.:
A. M. Wilson, *Supt* ....Columbia, Pa.
(2) N. J. Central Divs.: 573 m. 316 lo. 31,013 cars.
W. W. Stearns, *Gen. Supt*..... Elizabeth, N. J.
B. W. Burnett, *Pur. Agt* ......New York, N. Y.
Cen Div.: W. Woodcock, *M. M*. Elizabethport, N. J.
Geo. Hackett, *M. C. B*. ....Elizabethport, N. J.
C. G. Williams, *M. M*.........Jersey City, N. J.
John Alpaugh, *M. M*.........Phillipsburg, N. J.
L. Br. Div.: H. H. Nieman, *Supt*..Long Branch, N. J.
N. J. So. Div.: R. Blodgett, *Supt* ...Manchester, N. J.
Wm. Montgomery, *M. M*....Manchester, N. J.
Chas. N. Sawyer, *M. C. B*....Manchester, N. J.
Lehigh & Susquehanna Div.:
W. S. Polhemus, *Supt*. .. Mauch Chunk, Pa.
L. C. Brastow, *Supt. Mach*........Ashley, Pa.
Pittsburg, Bradford & Buffalo Ry. (*See Pitts. & West.*)
Pittsburg, Chartiers & Youghiogheny R. R.
4-8¾ g. 19 m.
Geo. S. Griscom, *Gen. Man*......Pittsburg, Pa.
Pittsburgh, Cincinnati & St. Louis Ry. (5 Gen. Divs.)
4-9 g. 916 m. 239 lo. 7,133 cars.
James McCrea, *Manager*.........Columbus, O.
Wm. Mullins, *Pur. Agt* .. ..Pittsburg, Pa.
Edward B. Wall, *Supt M. P*.......Columbus, O.
(1) P., C. & St. L. Div.: E. B. Taylor, *Supt*. Pittsburg, Pa.
C. B. Street, *M. M*. ....Dennison, O.
J. M. Copeland, *G. F. Car Shops*. Steubenville, O.
(2) C. & M. V. Div.: W. F. Black, *Supt*..Zanesville, O.
Leroy Kells, *M. M*..... ....Lancaster, O.
Wm. Meikle, *Gen. For*......... Lancaster, O.
Daniel Jewell, *Gen. F. Car Shops*. Lancaster, O.
(3) Li. Mi. Div.: Ralph Peters, *Supt*....Cincinnati, O.
Leroy Kells, *M. M*.............Cincinnati, O.
Jos. Underwood, *G. F. Car Shops*. Cincinnati, O.
(4) J. M. & I. R. R.: E. W. McKenna, *Supt*. Louisville, Ky.
Wm. Swanston, *M. M*. ...Jeffersonville, Ind.
Edw. Austin, *G. F. C. Shops*. Jeffersonville, Ind.
(5) Indianapolis & Vincennes R. R.
J. J. Turner, *Supt*........Indianapolis, Ind.
Robt. Curtis, *M. M*..............Columbus, O.
Pittsburg, Cleveland & Toledo R. R. In progress.
4-8¾ g. 43 m. 4 lo. 150 cars.
C. H. Andrews, *Pres*...........Youngstown, O.
Pittsburg, Ft. Wayne & Chicago Ry. (*See Penna. Co.*)
Pittsburg Southern Ry. (*See Balt. & O.*)
Pitts. & Castle Shannon R. R. 3-4 g. 9 m. 5 lo. 428 c.
James M. Bailey, *Gen. Supt*... .Pittsburg, Pa.
Holmes Ward, *M. M* ......Castle Shannon, Pa.
Wm. E. Long, *M. C. B* .. .... Pittsburg, Pa.
Pitts. & Lake Erie R. R. 4-8¾ g. 70 m. 31 lo. 1,820 c.
W. C. Quincy, *Gen. Man*.........Pittsburg, Pa.
R. W. Jones, *Mast. Trans*....... Pittsburg, Pa.
S. W. Haines, *M. M*.... ....Pittsburg, Pa.
Pitts. & Western R. R. 3 & 4-8½ g. 110 m. 18 lo. 365 c.
Pitts., Bradford & Buff. Ry. 3 g. 93 m. 8 lo. 163 c.
Tho. M. King, *Gen. Man*.........Allegheny, Pa.
J. T. Johnson, *Supt*.... ....Allegheny, Pa.
C. P. Ford, *Pur. Agt* ....Allegheny, Pa.
Chas. Kennedy, *Asst. Supt. & M. M*. do.
Pontiac, Oxford & Pt. Austin R. R. 100 m. in progress.
Geo. W. Debevoise, *Gen. Supt*...Oxford, Mich.
Port Huron & No.-Western Ry. 3 g. 218 m. 14 lo. 288 c.
H. McMorran, *G. Man. & P. A*. Port Huron, Mich.
J. R. Wadsworth, *Supt*.. ...Port Huron, Mich.
Chas. Deifenbach, *M. M*......Port Huron, Mich.
Benj. Hillier, *M. C. B*........Port Huron, Mich.
Port Jervis & Monticello R. R. 6 g. 24 m. 3 lo. 13 c.
M. V. Heller, *Gen. Man*......Port Jervis, N. Y.
Port Royal & Augusta Ry. 5 g. 180 m. 16 lo. 310c
J. N. Bass, *Supt*....................Augusta, Ga.
T. F. Warwick, *M. M. & M. C. B*. Augusta, Ga
Portland & Ogdensburg. 4-8½ g. 110 m. 11 lo. 311 c.
J. Hamilton, *Gen. Supt. & P. A*..Portland, Me.
M. M....... ....Portland, Me.
W. G. Brewer, *M. C. B*.... . ...Portland, Me.
Portland & Rochester R. R. 4-8½ g. 52 m. 7 lo. 230 c.
J. W. Peters, *Supt. & Pur Agt*...Portland, Me.
E. H. C. Tompson, *For. of Mach*..Portland, Me.
David Dow, *For. of Car Repairs*. Portland, Me
Potomac, Fred.'g & Pied. R. R 3 g. 38 m 2 lo. 38 c.
Will M. Grafton, *Supt*..... ..Fredericksburg, Va.
W. J. Sweigard, *M. M*....Fredericksburg, Va.
Pough., Hart. & Bos. R. R. 4-8½ g. 45 m. 4 lo. 65 c.
J. A. Perkins, *Supt*........Poughkeepsie, N. Y.
John L. Donaldson, *M. M* Poughkeepsie, N. Y.
Pratt Coal & Coke Company's R. R. 5 g. 9 m. 5 lo. 100 c.
W. L. Gude, *Gen. Man*........ Pratt Mines, Ala.
Prescott & Thirty-Fifth Parallel R. R.
4-8½ g. 77 miles in progress.
Samuel A. Henszey, *Gen. Man*. .Prescott, Ariz.
Prince Edward Island Ry. 3-6 g. 199 m. 18 lo. 280 c.
Jas. Coleman, *Supt. & Pur. Agt*.;
Jos. Unsworth, *M. Supt. & Storekeeper*; and
D. M. Fraser, *M. C. B*.. .Charlottetown, P. E. I.
Profile & Franconia Notch R. R. 3 g. 15 m. 3 lo. 18 c.
Emmons Raymond, *Pur. Agt*... Boston, Mass.
C. H. Greenleaf, *Supt*......Profile House, N. H.
Prospect Park & Coney Island R. R.
4-8½ g. 15 m. 8 lo. 123 cars.
R. Schermerhorn, *Supt*........Brooklyn, N. Y.
Martin Painter, *M. M*...........Brooklyn, N. Y.
Prov., Warren & Bristol R. R. 4-8½ g. 19 m. 5 lo. 57 c.
Waterman Stone, *Supt*.. .. ..Providence, R. I.
Rufus Smith, *M. M. & C. B*........Bristol, R. I.
Prov. & Springfield R. R. 4-8½ g. 23 m. 4 lo. 92 c.
Wm. Tinkham, *Gen. Man*.....Providence, R. I.
G. T. Richardson, *M. M*........Providence, R. I.
Prov. & Worcester. 4-8½ g. 66 m. 34 lo. 1,155 c.
W. E. Chamberlain, *Supt* .....Providence, R. I.
A. Griggs, *Supt. L. & C. D*....Providence, R. I.
Pullman's Palace Car Co. 564 passenger cars.
A. B. Pullman, *2d V.-Pr. & G. M*.. Chicago, Ill.
Geo. F. Brown, *Gen. Supt*....... ...Chicago, Ill.
Wm. A. Angell, *Pur. Agt*.... ......Chicago, Ill.
S. W. Bretzfield, *Asst. Pur. Agt*. New York, N. Y.
A. Rapp, *Man.* (Chicago Works)...Chicago, Ill.
H. L. Spaulding, *Man.* (Det. Shops). Detroit, Mich.
E. A. Benson, *Supt. Shops*... ... St. Louis, Mo.

Q

Quebec Central Ry. 4-8½ g. 147 m. 10 lo. 267 cars.
A. Steele, *Supt*.............. Sherbrooke, Que.
R. D. Morkill, *Pur. Agt*.......Sherbrooke, P. Q.
Jas. Seiveright, *M. M* ....Sherbrooke, P. Q.
Quebec, Montreal, Ottawa & Occidental Ry.
4-8½ g. 354 m. 36 lo. 993 cars.
L. A. Senecal, *Gen. Supt*........Quebec, Que.
Quebec & Lake St. John Ry. 4-8½ g. 36 m. 3 lo. 55 c.
J. G. Scott, *Manager*..............Quebec, Can.
Frank Fournier, *Supt*... ...St. Raymond, P. Q.
John T. Eames, *M. M*.. ....St. Raymond, P. Q.
Queen Anne's & Kent and Townsend Branch R. R.
(*See Penna.; (4) Div.*)

R

Raleigh & Augusta Air-Line: Carolina Central.
Raleigh & Gaston R. Rs. 4-8½ g. 436 m. 48 lo. 994 c
John C. Winder, *Gen. Man. & P. A*. Raleigh, N. C.
Raleigh Rds. 4-8½ g. 194 m. 22 lo. 563 cars.
B. R. Harding, *Supt. of Mach*. Raleigh, N. C.
Carolina Cen. R.R. 4-8½ g. 242 m. 26 lo. 431 c.
L. C. Jones, *Gen. Supt*.....Wilmington, N. C.
James Maglenn, *M. of Mach*. Laurinburg, N. C.
S. R. Ethridge, *M. C. B* ...Laurinburg, N. C.
Rensselaer & Saratoga R.R. (*See Del. & Hud. Can. Co.*)
Rhinebeck & Connecticut. (*See Hart. & Ct. Wn.*)
Richmond, Fredericksburg & Potomac R. R.
4-8½ g. 83 m. 15 lo. 146 cars.
E. T. D. Myers, *Gen. Supt*..... Richmond, Va.
T. L. Courtney, *Asst. Supt*......Richmond, Va.
H. Kuhn, *M. M*..................Richmond, Va.
W. H. Trainham, *M. C. B*.......Richmond, Va.
Richmond & Alleghany R.R. 4-9 g. 261 m. 21 lo. 837c.
Decatur Axtell, *V. P. & Gen. Man*. Richmond, Va.
M. Sweeney, *Pur. Agt*.. .... ..Richmond, Va
Geo. D. Harris, *M. M. & C. B*....Richmond, Va.
Richmond & Danville R. R. Co.'s Roads.
1,736 miles 218 loco. 3,833 cars.
A. L. Rives, *Gen. Man* ....Richmond, Va.
Peyton Randolph, *As. G. Man*..Richmond, Va.
J. P. Minetree, *Pur. Agt*........ Richmond, Va.
R. D. Wade, *Supt. Mo. Po*... ...Richmond, Va.
(1) Rich. & Dan. R. R. 5 g. 847 m. 131 lo. 2,687 cars.
Rich. & Dan. Div.: 5 g. 320 m. 80 lo. 1,797 c
Wm. H. Green, *Supt*...... ....Richmond, Va.
T. W. Gentry, *M. M*.... ....Richmond, Va.
J. B. Vaughan, *For. Car Sh*...Richmond, Va.
North Carolina Div. 5 g. 223 m. 22 lo. 268 cars.
A. B. Andrews, *Supt*.... ......Raleigh, N. C.
W. H. Turrentine, *M. M*. Comp'y's Shops, N. C.
J. C. Holt, *For. Car Sh*. Comp'y's Shop N. C.
Atlanta & Char. Air Line. 5 g. 286m. 31 lo. 415 c.
Narrow-Gauge Branches. 3 g. 80 m. 5 lo. 41 c.
Supt.... ....Atlanta, Ga.
W. A. Walden, *M. M*.. .. ....Atlanta, Ga.
Z. T. Smith, *For. Car Sh*.... ... Atlanta, Ga.
(2 Charlotte, Col. & Aug. R. R. 5g. 239 m. 22 lo. 287 c.
G. R. Talcott, *Supt*..........Columbia, S. C.
J. H. Green, *M. M.* (2 roads)...Columbia, S. C.
(3) Columbia & Greenville R. R. 5 g. 297 m. 22 l. 224 c.
G. S. Talcott, *Supt*...........Columbia, S. C.
J. O. Meredith, *For. E. & C. Rep*.. do.
(4) Virginia Midland Ry. 4-8½ g. 353 m. 41 lo. 631 c.
W. M. S. Dunn, *Eng. & Supt*. Alexandria, Va.
J. E. Waddey, *M. of M*......Alexandria, Va.
J. T Nalls, *M. C. B*. ....Alexandria, Va.
Richmond & Petersburg R.R. 4-8½ g. 25 m. 8 lo. 132 c.
J. R. Kenly, *Supt*..... ....Richmond, Va.
John O'Brien, *M. M*.............Richmond, Va.
Rio Grande R. R. 3-6 g. 22 m. 3 lo. 40 cars.
M. J. Gomila, *Rec. & Gen. Man*. Brownsville, Tex.
G. W. Rendall, *M. M*......... Brownsville, Tex.
M. Markwood, *M. C. B*.... ....Brownsville, Tex.
Rio Grande & Pecos Ry. 4-8½ g. 27 m. In progress.
W. W. Hungerford, *Man*.........Laredo, Tex.
Rochester & Lake Ontario Ry. 4-8½ g. 6 m. 2 lo. 10 c.
N. B. Ellison, *Man* ....Rochester, N. Y.
Rochester & Pittsb'g. R. R. 4-8½ g. 134 m. 21 lo. 1,251 c.
Geo. E. Merchant, *Gen. Man*...Rochester N. Y.
J. G. Gardiner, *Gen. Supt*....Rochester, N. Y.
J. P. Hovey, *M. M*........ ....Rochester, N. Y.
J. R. Sherburne, *For. Sh*..... ..Buffalo, N. Y.
Rock Island & Mercer County R. R., and
Rock I'd & Peoria Ry. 4-8½ g. 113 m. 13 lo. 357 c.
R. R. Cable, *V.-P. & Gen. Supt*..Rock Island, Ill.
R. I. & P. Ry.: H. B. Sudlow, *Supt. & P. A*. do.
Joseph Elder, *M. M*...............Peoria, Ill.
R. I. & M. C. Rd.: B. T. Cable, *Supt*. R'k Island, Ill.
J. H. Parks, *M. M*............ .Rock Island, Ill.
Rogersville & Jefferson R. R. 5 g. 16 m. 1 lo. 6 cars.
C. M. Leuty, *Supt*........ Rogersville, Tenn.
Rome (Ga.) R. R. 5 g. 20 m. 2 lo. 17 cars.
Eben Hillyer, *Supt*........... ..... Rome, Ga.
O. W. Harbin, *M. M. & C. B*......... Rome, Ga.
Rome, Watertown & Ogdensburg R. R.
4-8½ g. 417 m. 54 lo. 1,400 cars.
H. M. Britton, *Gen. Man. & P. A*. Oswego, N. Y.
Geo. H. Haselton, *M. M. & C. B*..Oswego, N. Y.
E'n Div.: J. D. Remington, *Supt*. Watertown, N. Y.
W'n Div.: W. H. Chauncey, *Supt*..Oswego, N. Y.
Roodhouse & Scottsville Ry. In progress.
Geo. P. Merrill, *Gen. Man*..........Chicago, Ill.
Ruby Hill R. R. (*See Eureka & Pal.*)
Rumford Falls & Buckfield R.R. 4-8½ g. 29 m. 2 l. 62 c.
L. L. Lincoln, *Supt*.............. Canton, Me.
O. Spaulding, *Pur. Agt*...........Buckfield, Me.
E. R. Oldham, *M. M*.............Buckfield, Me.

S

Sabine & East Texas Ry. (*See Cen. Pac.*)
Sacramento & Placerville R. R. (*See Cen. Pac.*)
Saginaw Bay & Northw'n R.R. 4-8½ g. 31 m. 6 lo. 136 c.
J. Jackson, *Gen. Man*.... ...Pinconning, Mich.
F. T. Lillote, *Act. Pur. Agt*...Pinconning, Mich
Edward Keeler, *M. M*........Pinconning, Mich.
Saginaw, Tuscola & Huron R. R.
3 g. 37 m. 3 lo. 83 cars.
C. S. McMillan, *Gen. Supt*..E. Saginaw, Mich.
Saginaw Valley & St. Louis R. R. 4-8½ g. 39 m. 4 l. 64 c
N. W. Merrill, *Supt* ....Saginaw, Mich.
Allan Bourn, *Pur. Agt*.. ....Detroit, Mich.
Geo. C. Watrous, *M. M*..... ....Iona, Mich.
Salisbury R. R. 4-8½ g. 11 m. 1 lo. 1 car.
R. J. Batzer, *Supt*...............Pittsburgh, Pa.
Salt Lake & Western R. R. (*See Un. Pac.; (6) Div.*)
San Francisco & No. Pac. 4-8½ g. 139 m. 11 lo. 245 c.
Arthur Hughes, *Gen. Man*..San Francisco, Cal.
H. C. Whiting, *Supt*.... ....Petaluma, Cal.
Ed. Reynolds, *Gen. M. M*.........Donahue, Cal.
John Martin, *M. C. B*. .... Donahue, Cal.
Sanborn, Cooperstown & Turtle M. R. R. In progress.
C. A. Roberts, *Gen. Man*. .. ... Sanborn, Dak.
Sandy River R. R. 2 g. 18 m. 2 lo. 23 cars.
D. L. Dennison, *Supt*.......... ....Phillips, Me.
M. Saunders, *M. M. & C. B*....... ..Phillips, Me.
Sandusky, Mansfield & Newark R. R. (*See B. & O.*)
Sanford & Indian River R. R. (*See So. Flor.*)
San Luis Obispo & Santa Maria R. R.
3 g. 20 m. 2 lo. 30 cars.
Charles Goodall, *Man*......San Francisco, Cal.
San Pete Valley R. R. 3 g. 33 m. 2 lo. 57 cars.
F. C. Hand, *Supt*...................Wales, U. T.
J. E. Bamberger, *Pur. Agt*.... Salt Lake, U. T.
B. Bates, *M. M*.................... Wales, U. T.
Santa Cruz R. R. (*See So. Pac.; Nor'n Div.*)
Saratoga, Mt. McGregor & Lake George R. R.
3 g. 11 m. 3 lo. 12 cars.
John McGee, *Supt*. ....Saratoga Springs, N. Y.
Savannah, Florida & W'n Ry, 5 g. 425 m. 50 lo. 736 c.
H. S. Haines, *Gen. Man*........Savannah, Ga.
R. G. Fleming, *Supt*.... ....Savannah, Ga.
F. S. Pendergast, *Ch. Eng*........Savannah, Ga.
A. A. Aveilhé, *Pur. Agt*..........Savannah, Ga.
G. M. D. Riley, *M. of Mach*......Savannah, Ga.
Jos. W. Rowell, *For. Car Dept*. Savannah, Ga.
Sav., Griffin & No. Ala. R. R. *Op. by Central (Ga.).*
Savannah, Skiddaway & Seaboard R. R.
5 g. 12 m. 3 lo. 12 cars.
Edward J. Thomas, *Supt* ....Savannah, Ga.
R. F. Brown, *M. M* ... ...Savannah, Ga.
G. W. Mattan, *M. C. B*...........Savannah, Ga.
Schuylkill & Lehigh R. R. (*See Phil. & Read.*)
Scoharie Valley R. R (*See Middleburg & Sch.*)
Scioto Valley R. R. 4-8¾ g. 132 m. 17 lo. 564 cars.
Geo Skinner, *Supt*. . ...Columbus, O.
R. Bromley, *M. M. & P. A*.....Portsmouth, O.
Seaboard & Roanoke R. R. 4-8½ g. 80 m. 21 lo. 384 c.
E. G. Ghio, *Mast. of Trans*....Portsmouth, Va.
J. A. Walton, *Pur. Agt*........Portsmouth, Va.
M. M. Pendleton, *S. M. P. & M*. Portsmouth, Va.
Sedalia, Warsaw & Southern Ry. (*See Mo. Pac.*)
Sharpsville R. R. 4-8½ g. 23 m. 3 lo. 13 cars.
Walter Pierce, *Gen. Man*.......Sharpsville, Pa.
Shenandoah Valley R. R. 4-9 g. 249 m. 32 lo. 849 c.
Norfolk & Western R. R. 5 g. 486 m. 82 lo. 1,779 c.
J. H. Sands, *Supt* .... .Roanoke, Va.
W. C. De Armond, *Pur. Agt*. ..Philadelphia, Pa.
Chas. Blackwell, *Supt. of M. P*...Roanoke, Va.
Sh. Val. Rd.: D. W. Flickwir, *Supt*., Roanoke, Va.
W. Welch, *M. M*.......... ......Roanoke, Va.
N. & W.; W. Div.: Frank Huger, *Supt*.; and
F. Sterk, *M. M*................Lynchburg, Va.
N. & W.; E. Div.: N. M. Osborne, *Supt*.; and
J. T. Robinett, *M. M. & C. B*...Petersburg, Va.
Shenango & Allegheny R.R 4-9½ g. 57 m. 8 lo. 248 c.
J. T. Blair, *G. Man. & Pur. Agt*. Greenville, Pa.
Edw. Richardson, *M. M. & C. B*. Greenville, Pa.
Shepaug R. R. 4-8½ g. 38 m. 3 lo. 28 cars.
Edwin McNeill, *Supt*............. Litchfield, Ct.
C. M. Allen, *M. M*.............. Litchfield, Ct.
Ship Is., Ripley & Ky. R. R. 3 g. 25 m. 2 lo. 23 cars.
C. L. Harris, *Supt. & Pur. Agt*....Ripley, Miss
W. H. Phelps, *M. M*.................Ripley, Miss.
Silver City, Deming & Pacific R. R. 3 g. 47 m. 3 l. 141 c.
John W. Smith, *Gen. Supt*....Silver City, N. M.
Silver Lake Ry. 4-8½ g. 6 m. 1 lo. 4 cars.
E. G. Matthews, *Supt*............. ..Perry, N. Y
Sinaloa & Durango R. R. 4-8½ g. 38 m. 2 lo. 40 cars.
H. M. Fickinger, *Supt*....Altata, Sinaloa, Mex.
John E. Bell, *M. M*.............. Culiacan, Mex.
Skaneateles R. R. 4-8½ g. 5 m. 2 lo. 5 cars.
J. McNamara, *Supt*........ Skaneateles, N. Y.
Sioux City & Pacific R. R. 4-8½ g. 427 m. 28 lo. 785 c.
P. E. Hall, *Gen. Man. & P. A*. Cedar Rapids, Ia.
C. M. Lawler, *Gen. Supt*....Missouri Valley, Ia.
J. S. Wattles, *Supt*.... ... Missouri Valley, Ia.
C. F. McCoy, *Asst. Supt*.............Blair, Neb.
S. A. Teal, *M. M*....... ....Missouri Valley, Ia.
W. H. Ramseyer, *M. C. B*. ..Missouri Valley, Ia.
Smyrna & Delaware Bay R. R. (*See Kent County.*)
Sodus Bay & Southern Ry. 4-8½ g. 34 m. 4 lo. 40 c.
G. A. Stearns, *Gen. Man*. ..Sodus Point, N. Y.
S. B. Stuart, *Supt. & Pur. Agt*. Sodus Point, N. Y.
J. C. Thomas, *M. M*.........Sodus Point, N. Y.
C. H. Hill, *M. C. B* ....Sodus Point, N. Y.
Somerset R. R. 4-8½ g. 25 m. 3 lo. 24 cars.
W. M. Ayer, *Supt & Pur. Agt*. W. Waterville, Me.
C. Crowell, *M. C. B*.. ....No. Anson, Me.
Somerset & Cambria R. R. (*See B. & O.*)
Sonora Ry. (*See A., T. & S. Fe.*)
South & North Alabama R. R. (*See Louis. & Nash.*)
South Carolina Ry. 5 g. 246 m. 42 lo. 742 cars.
John B. Peck, *Gen. Man*. ......Charleston, S. C
S. B. Pickens, *Pur. Agt*........Charleston, S. C.
P. J. Cochrane, *Mast. of Mach*. Charleston, S. C.
Geo. H. Gramling, *M. C. B*....Charleston, S. C.
South-Eastern Ry. 4-8½ g. 260 m. 26 lo. 826 cars.
T. A. McKinnon, *Gen. Man*.....Montreal, Can.
A. G. Eastman, *M. M*.... ..W. Farnham, P. Q.
South Florida R. R. 3 gauge 40 m. 5 lo. 53 cars.
B. R. Swoope, *Supt. & P. A*.......Sanford, Fla.
C. C. Haskell, *Pur. Agt*....... ...Sanford, Fla.
J. A. Campbell, *M. M*.............Sanford, Fla.
A. D. Stentiford, *M. C. B*..........Sanford, Fla.
South Mountain R. R. 4-8½ g. 18 m. 4 lo. 22 c.
W. H. Woodward, *Supt*. Pine G've Furnace, Pa.
South Pacific Coast R. R. 3 g. 81 m. 14 lo. 500 cars
Geo. Revett, *Gen. Supt*... .San Francisco, Cal.
G. H. Waggoner *Pur. Agt*..San Francisco, Cal.
E. L. Reese, *M. M. & C B*.. ....Newark, Cal.
South-Western R. R. (Ga.) (*See Central of Ga.*)
South-Western Ry. (Ky.) 4-8½ g. 4 m. 1 lo. 38 cars.
J. M. Wilson, *Supt*............Harrodsburg, Ky.
J. Tomlinson, *Pur. Agt*......Harrodsburg, Ky.
Southern Central R. R. 4-8½ g. 156 m. 21 lo. 467 c.
James G. Knapp, *Supt. & Pur. Agt*. Auburn, N. Y.
Chas. G. Brown, *M. M*... ...Auburn, N. Y.
H. Mooney, *M. C. B*..............Auburn, N. Y.
Southern Kansas Ry. (*See At., Top. & Santa Fe.*)
Southern Maryland R. R. 4-8½ g. 20 m. 1 lo. 20 c.
Robert Knight, *Supt*. ....Brandywine, Md.
C. R. Joyce, *M. M*......... .. Brandywine, Md.
Southern Pacific R. R. 4-8½ g. 198 m. 30 lo. 728 c.
Northern Div. (*For other Divs. see Cen. Pac.*)
A. C. Bassett, *Supt*......San Francisco, Cal.
J. R. Watson, *Pur. Agt*.....Sacramento, Cal.
J. T. Wilson, *M. M*..... ..San Francisco, Cal.
F. N. Bellisle, *M. C. B*. ...San Francisco, Cal.
Southern Pacific R. R. of Arizona. (*See Cen. Pac.*)
Southern Pacific R. R. of New Mexico. (*See Cen. Pac.*)
Spartanburg, Union & Columbia R. R.
(*See Rich. & Dan.; (3) Div.*)
Spring Brook R. R. 4-3 g. 8 m. 1 lo. 18 cars.
Charles Pugh, *Pres*......... ... ..Pittston, Pa.
Spring Hill & Parrsboro Ry. (*See Cumberland.*)
Springfield, Effingham & So.-E'n Ry. (*See Ind. & Ill.*)
Springville & Sardinia Ry. 4-8½ g. 12 m. 1 lo. 8 c.
Bertrand Chaffee, *Pres*.... ..Springville, N. Y.
St. Croix & Penobscot R. R. 4-8½ g. 22 m. 4 lo. 195 c.
S. W. Haycock, *Supt. & Pur. Agt*. .Calais, Me.
G. H. Corsen, *M. M*.... .. ..Milltown, Me.
H. C. Tincker, *M. C. B*...........Milltown, Me.
St. John & Maine Ry. (*See New Brunswick.*)
St. John's Ry 4-8½ g. 14½ m. 2 lo. 24 cars.
R. McLaughlin, *Pr. & Supt*. .Jacksonville, Fla.
Geo. Ferro, *M. of Mach*.. ....Tocoi, Fla.
St. John's & Lake Eustis Ry. 3 g. 26 m.
W. J. Jarvis, *Supt*............ Ft. Mason, Fla.
St. Johnsb'ry & Lake Champ 4-8½ g. 120 m 10 lo. 372 c.
A. B. Jewett, *Supt. & P. A*..St. Johnsbury, Vt.
Geo. E. Howe, *M. M. & C. B*. St. Johnsbury, Vt.
St. Joseph Valley R. R. 3 g. 15 m. 1 lo. 11 cars.
J. H. Matthews, *Gen. Supt*. Berrien Springs, Mich.
St. Joseph & Des Loge Ry. 3 g. 13 m. 3 lo. 64 cars.
T. T. Onderdonk, *Supt*.. .. Bonne Terre, Mo.
St. Joseph & Western R. R. (*See Union Pac.; (1) Div.*)
St. Joseph & Des Moines R. R. (*See K. C., St. J. & C. B.*)
St. Lawrence & Ottawa Ry. (*See Can. Pac.*)
St. Louis, Alton & Terre Haute R. R.
Main Line. (*See C., C., C. & I.; Ind. & St. L. Div.*)
St. Louis & Cairo Div.: 4-8½ g 137 m. 17 lo. 800 c.
G. W. Parker, *Gen. Man*.......St. Louis, Mo.
J. L. Hinckley, *Supt*... ... .Belleville, Ill.
A. M. De Clerq, *M. M*.......... St. Louis, Mo.
St. Louis Bridge Co. and Tunnel R. R.
4-8½ g. 31 m. 18 lo. 11 cars.
Wm. Taussig, *Gen. Man*..........St. Louis, Mo.
A. W. Dickinson, *Supt*.... ....St. Louis, Mo.
J. E. Williams, Jr., *Pur. Agt*....St. Louis, Mo.
H. M. Smith, *M. M*................St. Louis, Mo.
St. Louis Coal R. R. 4-8½ g. 93 m. 10 lo. 217 cars.
Jas. Prentice, *Supt*..............Carbondale, Ill.
Jas. C. Bryden, *Pur. Agt*... ....St. Louis, Mo.
St. Louis, Des Moines & Northern Ry. 4-8½ g. 43 m.
C. F. Merk, *Supt*................Des Moines, Ia.
St. L., Ft. Scott & Wichita R.R. 4-8½ g. 130 m 6 l. 337 c.
F. Tiernan, *V. P. & Gen. Man*. Fort Scott, Kan.
J. W. Miller, *Gen. Supt*........Fort Scott, Kan.
A. Popkess, *Pur. Agt*...... ...Fort Scott, Kan.
Henry Berger, *M. M* ....Ft. Scott, Kan.
A. A. Tiddell, *M. C. B*......... ..Ft. Scott, Kan.
St. L., Hannibal & Keokuk. 4-8½ g. 85 m. 5 lo. 70 c.
W. W. Walker, *Gen. Supt*....... Hannibal, Mo.
Geo. Douglass, *Pur. Agt*.........Hannibal, Mo.
St. Louis, Iron Mt. & So'n Ry. (*See Mo. Pac.; (4) Div.*)
St. L., Keokuk & No.-W'n. Ry. (*See C., B. & Q.*)
St. L., Salem & Little Rock. 4-9 g. 72 m. 5 lo. 111 c.
H. A. Crawford, *V. Pr. & P. A*...St. Louis, Mo.
E. B. Sankey, *Supt*..................Salem, Mo.
Thomas Everson, *M. M*. ....Steelville, Mo
J. W. Houston, *M. C. B*...........Steelville, Mo.
St. L., Van. & T. Haute R.R. (*See Penna. Co.; (10) Div.*)
St. Louis & Cairo R. R. 3 g. 152 m. 22 lo. 896 cars.
Chas. Hamilton, *Gen. Supt*..... .St. Louis, Mo.
R. M. Pringle, *M. M*..............St. Louis, Mo.
St. L. & San Fran. Ry. 4-8½ g. 854 m. 103 lo. 3,258 c.
C. W. Rogers, *V. P. & Gen. Man*..St. Louis, Mo.
D. H. Nichols, *Mast. Tran*..No. Springfield, Mo.
A. G. Thompson, *Pur. Agt*.......St. Louis, Mo.
M. Kearney, *M. M. & C. B*..No. Springfield, Mo.
East Div.: A. Veech, *Supt*...... ..St. Louis, Mo.
Central Div.: W. A. Thoms, *Supt*. do.
Kan. Div.: J. R. Wentworth, *Supt*. Neodesha, Kan.
St. Martin's & Upham Ry. 4-8½ g. 30 m. 2 lo. 8 cars.
A. E. Killam, *Manager* ..... St. Martin's, N. B
St. Paul, Minneapolis & Manitoba Ry.
4-8½ g. 1,326 m. 201 lo. 5,068 cars.
A. Manvel, *Gen. Man*............St. Paul, Minn.
E. B. Wakeman, *Asst. Gen. Supt*. St. Paul, Minn.
J. C. Morrison, *Pur. Agt*........St. Paul, Minn.

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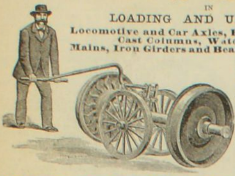

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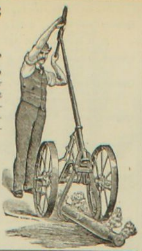

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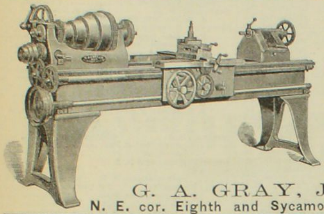

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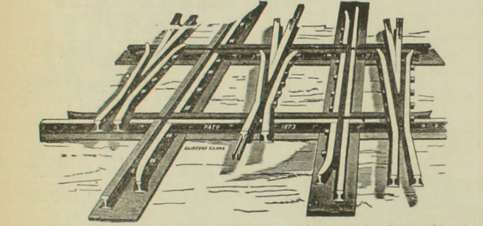

These Frogs and Crossings are made of steel rail, combined with a wrought-iron frame, and bound together transversely with strong bolts, which gives them great strength and durability without destroying their elasticity. They are connected at all ends by Fish-Plate Joints, and lie on the same tie surface as the running rail without any cutting of ties, thus saving a great deal of time and labor in putting in place on track.

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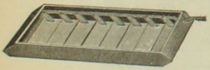

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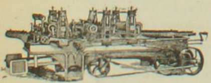

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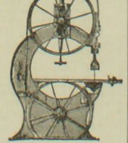

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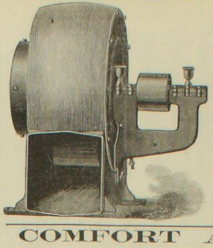

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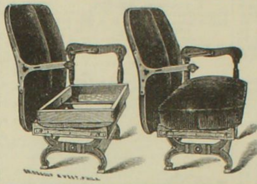

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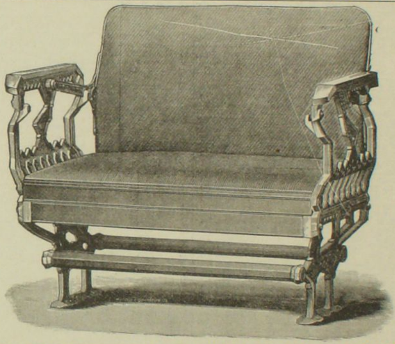

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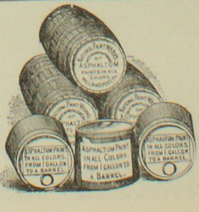

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Breck. Div.: W. S. Kemp, *Supt*...St. Paul, Minn.
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No'n Div.: A. Guthrie, *Supt*.....Crookston, Minn
St. Paul & Duluth R. R. 4-8½ g. 196 m. 34 lo. 980 c.
H. P. Breed, *Gen. Supt*..... ....St. Paul, Minn.
J. G. Callahan, *Pur. Agt*........St. Paul, Minn.
W. McFarland, *M. M*............St. Paul, Minn.
John Hill, *M. C. B*. ....St. Paul, Minn.
State Line & Sullivan R. R. 4-8½ g. 25 m. 3 lo. 263 c.
I. O. Blight, *Supt*................Towanda, Pa.
Staten Island R. R. 4-8¼ g. 13 m. 4 lo. 18 c.
J. W. Wilbur, *Supt*............New York, N. Y.
Stony Clove & Catskill Mountain R. R.
3 g. 14 m. 2 lo. 21 cars.
Geo. Coykendall, *Gen. Supt*....Rondout, N. Y.
Stony Creek R. R. 4-8½ g. 11 m.
Geo. B. Boggs, *Supt* .... Norristown, Pa.
Sterling Mountain Ry. 6 g. 8 m. 2 lo. 145 cars.
J. C. Missimer, *Supt*..........Sloatsburg, N. Y.
Suffolk Lumber R. R. 3 g. 15 m. 3 lo. 41 cars.
W. M. Whaley, *Supt*.. ....Suffolk, Va.
Summit Branch R. R. 4-9 g. 20 m. 7 lo. 10 cars.
Thomas Gucker, *Supt* ....Williamsport, Pa.
Susquehanna & Delaware River R. R. In progress.
D. Y. Kilgore, *Pres*...........Philadelphia, Pa.
Sussex R. R. (*See Del., Lack. & West.*)
Syracuse, Binghamton & N. Y. R. R. (*See D. L. & W.*)
Syr., Ontario & N. Y. R. R. (*See N. Y., W. Sh & Buf.*)
Syracuse, Geneva & Corning; Corning, Cowanasque & Antrim R. Rs. 4-8½ g. 142 m. 28 lo. 1,044 c.
A. H. Gorton, *Supt*....... ......Corning, N. Y.
W. E. Gorton, *Asst. Supt*.........Corning, N. Y.
Andrew Beers, *Pur. Agt*........Corning, N. Y.
O. C. Patchell, *M. M*.............Corning, N. Y.
C. J. Butler, *M. C. B*.............Corning, N. Y.

T

Tawas & Bay County R. R. 3-2 g. 28 m. 2 lo. 100 c.
Henry Clark, *Gen. Supt*......Tawas City, Mich.
Tennessee Coal R. R. 5 g. 28 m. 8 lo. 204 cars.
A. M. Shook, *Gen. Man*......Tracy City, Tenn.
W. A. Knight, *M. M*......... Tracy City, Tenn.
Tennessee & Sequatchee Valley R. R.
3 g. 42 m. 1 lo. 24 cars.
Isaac Britton, *Gen. Supt*. ....Jewett, Tenn.
P. V. Mooney, *Pur. Agt*......Spring City, Tenn.
Terre Haute & Indianapolis R. R.
4-9 g. 387 m. 88 lo. 3,702 cars.
Joseph Hill, *Gen. Supt*.... .....St. Louis, Mo.
C. R. Peddle, *P. Agt*........Terre Haute, Ind.
Geo. H. Prescott, *S. M. P. & M.* Terre Haute, Ind.
E. D. Carter, *M. C. B* ......Terre Haute, Ind.
Clinton Idler, *M. M*...... ..Indianapolis, Ind.
Chas. Butler, *M. M*..... ....Effingham, Ill.
A. W. Quakenbush, *M. M*...Logansport, Ind.
Terre Haute & Logansport. (*See Penn. Co.; (10) Div.*)
Terre Haute & So.-Eastern Ry. 4-9 g. 44 m. 2 lo. 145 c.
Geo. Atherton, *Supt*.........Terre Haute, Ind.
Texas Central Ry. (*See Hous. & Tex. Cen.*)
Texas-Mexican Ry. (*See Mex. Nat.*)
Texas Trunk R. R. 4-8½ g. 36 m. 2 lo. 8 cars.
Hugh Irwin, *Gen. Supt*.......... ..Dallas, Tex.
Texas Western Ry. 3 g. 52 m. 2 lo. 44 cars.
E. L. Heriot, *Gen. Man*. ....Houston, Tex.
J. W. Goodwin, *Supt*..... ......Houston, Tex.
T. F. Glispin, *M. M*..............Houston, Tex.
Texas & N. O. R. R. (*See Cen. Pac.; G. H. & S. A. Div.*)
Texas & Pacific. (*See Mo. Pac. Ry.; (6) Div.*)
Texas & St. Louis Ry. 3 g. 672 m. 66 lo. 1,382 cars.
W. R. Woodard, *Gen. Man*......St. Louis, Mo.
F. W. Paramore, *Pur. Agt* ....St. Louis, Mo.
G. W. Prescott, *S. M. P. & M* ...St. Louis, Mo.
A. E. Buchanan, *Supt. Trans*......Tyler, Tex.
Tex. Div.: A. L. Horner, *Supt* ....Tyler, Tex.
Tionesta Valley R. R. 3 g. 7 m.
George Dickinson, *Gen. Supt* .... Sheffield, Pa.
Tioga and Elmira State Line R. Rs.
4-8½ and 6 g. 67 m. 18 lo. 960 cars.
R. Dupuy, *Supt*.... ....Blossburg, Pa.
J. A. Hardenburg, *Pur. Agt*.. New York, N. Y.
Pere Bonny, *M. M*...............Blossburg, Pa.
D. H. Stratton, *M. C. B*...... .Blossburg, Pa.
Toledo, Ann Ar. & Gr. Tr. Ry. 4-8½ g. 63 m. 9 lo. 186 c.
J. M. Ashley, *Gen. Man*......Ann Arbor, Mich.
H. W. Ashley, *Supt. & Pur. Agt*. do
C. C. Dodge, *M. M*............Ann Arbor, Mich.
Toledo, Cin. & St. Louis R. R. 3 g. 798 m. 63 lo. 2,509 c.
E. P. Murray, *Gen. Supt*... ....Toledo, O.
F. W. Stewart, *P. Agt*................Toledo, O.
L. W. James, *Supt. Mach*.......... Toledo, O.
C. H. Mead, *Gen. M. C. B* .... .Delphos, O.
Toledo Div.: W. H. Vandergrift, *Supt*.: do
Thos. Robertson, *M. M*..... ......Delphos, O.
J. S. Wiers, *M. C. B*..............Delphos, O.
P. H. Murphy, *M. M* .. ..Charleston, Ill.
Del. & Cin. Divs.: C. A. Bell, *Supt*........Cin., O.
T. J. Hamer, *M. M* ....Cincinnati, O.
So. Ea'n Div.: W. W. Cummings.. ...Dayton, O.
W. H. Anderson, *M. M*............Dayton, O.
St. Louis Div.: Frank F. Allen....Charleston, Ill.
Ironton Div.: C. C. Clark, *Supt*. ....Ironton, O.
Toledo & Indianapolis R. R. 4-8½ g. 43 m. 4 lo. 118 c.
J. B. Clark, *Gen. Supt*.... .... Toledo, O.
T. Cook, *Supt. of M. P*..............Toledo, O.
Toledo & South Haven R. R. (*See Paw Paw.*)
Tonawanda Val. & Cuba R. R. (*See Brad., B. & K.*)
Toronto, Grey & Bruce Ry. 4-8½ g. 191 m. 28 l. 446 c.
Edmund Wragge, *Gen. Man*... .Toronto, Can.
W. Watson, *Pur. Agt* .... Toronto, Can.
David Preston, *M. M*............ Toronto, Can.
Toronto & Nipissing Ry. (*See Mid. Ry. of Can.*)
Troy & Boston R. R. 4-8½ g. 48 m. 20 lo. 484 cars.
D. Robinson, *Pres. & Pur. Agt*......Troy, N. Y.
Joseph Crandell, *Supt*............. Troy, N. Y.
Z. B. Davis, *M. M* ....Troy, N. Y.
R. V. Coon, *M. C. B*.................Troy, N. Y.
Troy & Greenfield R. R. 4-8½ g. 44 m.
A. W. Locke, *Man*.........North Adams, Mass.
Tuckerton R. R. 4-8½ g. 31 m. 2 lo. 29 cars.
J. J. Pharo, *Supt. & Pur. Agt*. Tuckerton, N. J.

U

Ulster & Delaware R. R. 4-8½ g. 74 m. 10 lo. 214 cars.
Jas. H. Jones, *Supt*.............Rondout, N. Y.
Joseph Rush, *M. M* ....Rondout, N. Y.
John H. Decker, *M. C. B*........Rondout, N. Y.
Union Pacific Ry. (7 Gen. Divs.)
3 & 4-8½ g. 4,551 m. 510 lo. 10,550 cars.
S. H. H. Clark, *Gen. Man*.........Omaha, Neb.
Thos. L. Kimball, *Asst. Gen Man*. Omaha, Neb.
M. H. Goble, *Pur. Agt*.............Omaha, Neb.
I. H. Congdon, *S. M. P. & C. D*...Omaha, Neb
John Wilson, *Asst. do*...............Omaha, Neb.
(1) Neb. Div.: P. J. Nichols, *Gen. Supt*..Omaha, Neb.
E. Div.: C. B. Havens, *Supt*.. .....Omaha, N. B.
R. McConnell, *M. M*............ Omaha, Neb.
A. M. Collett, *M. C. B*...........Omaha, Neb.
St. J. & W. Div.: L. D. Tuthill, *Supt*. St. Joseph, Mo.
E. Sleppy, *M. M*...............G. Island, Neb.
Moun. Div.: W. A. Deuel, *Supt*..Cheyenne, W. T
J. H. McConnell, *M. M*. ....N. Platte, Neb.
R. McDougall, *M. M*.........Cheyenne, W. T.
(2) Wy. Div.: E. Dickenson, *Gen. Supt*..Laramie, W. T.
T. E. Lewis, *M. M*. ....Laramie, W. T.
T. A. Davis, *M. M*.............Rawlins, W. T.
Wes. Div.: C. E. Wurtelle, *Supt*. Evanston, W. T.
Geo. F. Chapman, *M. M*.......Evanston, W. T.
(3) Idaho Div.: W. B. Doddridge, *Gen. Supt*. Ogden, U.
F. Rearden, *M. M*.. .... Pocatello, Id.
Ogden Short Line Div.:
R. Blickensderfer, *Supt*.... .. Pocatello, Id.
Utah & Northern Div.:
W. P. P. St. Clair, *Supt*... ...Eagle Rock, Id.
R. Croft, *M. M*... ....Logan, Utah.
W. J. Hemphill, *M. M*........Eagle Rock, Id.
J. W. Paul, *Gen. For. C. D*.. .Eagle Rock, Id.
(4) Col. Cent. Div.: A. A. Egbert, *Gen. Supt*. Denver, Col.
F. Meirtsheimer, *M. M*. ....Denver, Col.
C. C. Div.: P. Touhy, *Supt*..........Denver, Col.
So. Park Div.: G. W. Evans, *A. Supt*..Como, Col.
(5) Kan. Div.: S. T. Smith, *G. Supt*..Kansas City, Mo.
K. Val. Div.: J. O. Brinkerhoff, *Supt*. Kan. C'y, Mo.
Jas. Mackenzie, *M. M*. .... Armstrong, Kan.
Kansas Central Div.:
W. T. Kelley, *Supt*..... ..Leavenworth, Kan.
Smoky Hill Div.:
O. H. Dorance, *Supt*...........Wallace, Kan.
J. B. Dailey, *M. M*. ....Ellis, Kan.
(6 Salt Lake & Western Div.:
W. W. Ritter, *Supt*......Salt Lake City, Utah.
(7) Nevada Central Ry. 3 g. 93 m. 4 lo. 78 cars.
F. W. Dunn, *Gen. Supt. & P. A*. Battle Mt., Nev.
Z. T. Sprigg, *M. M*........Battle Mountain, Nev.
United States Rolling Stock Co. 23 lo. 4,834 cars.
A. Hegewisch, *Pres*............New York, N. Y.
W. H. Chaddock, *Pur. Agt*........Chicago, Ill.
Upson County R. R. (*See Central of Ga.*)
Utah Central Ry. 4-8½ g. 280 m. 21 lo. 358 cars.
John Sharp, *Gen. Supt*...Salt Lake City, Utah.
S. H. Hill, *Pur. Agt*.......Salt Lake City, Utah.
Geo. G. Bywater, *M. M*..Salt Lake City, Utah.
Peter Reid, *M. C. B*.......Salt Lake City, Utah.
Utah & Nevada Ry. 3 g. 37 m. 3 lo. 33 cars.
W. W. Ritter, *Gen. Man*...Salt Lake City, Utah.
Robert Anderson, *M. M*...Salt Lake City, Utah.
Utah & Northern Ry. (*See Union Pac.; (3) Div.*)
Utah & Pleasant Valley Ry. (*See Den. & Rio. Gr.*)
Utica, Ithaca & Elmira Ry. 4-8½ g. 120 m. 11 lo. 152 c.
C. R. Fitch, *Supt* ....Elmira, N. Y.
C. J. Howe, *M. M. & M. C. B*..Breesport, N. Y.
Utica, & Black Riv. R. R. 4-8½ g. 180 m. 22 lo. 452 c.
J. F. Maynard, *Gen. Supt. & P. A*..Utica, N. Y.
John Bailey, *M. M*.................Utica, N. Y.
David James, *M. C. B*..............Utica, N. Y.

V

Vaca Vall. & Clear Lake R. R. 4-8½ g. 30 m. 2 lo. 19 c.,
G. B. Stevenson, *Gen. Supt*... ..Vacaville, Cal.
Valley Ry. (Ohio) 4-8¾ g. 85 m. 15 lo. 581 cars.
J. E. Turk, *Supt. & P. Agt*........Cleveland, O.
Chas. Blanchard, *M. C. B*..... ..Cleveland, O.
Valley R. R. Va. 4-8½ g. 26 m.
S. Spencer, *Pres*.. ....Baltimore, Md.
Vermont Valley R. R. (*See Conn. River.*)
Vicksburg & Brunswick R. R. (*See Cen. of Ga.*)
Vicksburg & Meridian R. R. (*See Cin., N. O. & Tex. Pac.*)
Vicks. Shreveport & Pac. R. R. (*See C., N. O. & T. P.*)
Victoria Ry. (*See Midland Ry. of Can.*)
Virginia Midland Ry. (*See Rich. & Dan.; (4) Div.*)
Virginia & Truckee R. R. 4-8½ g. 54 m. 17 lo. 375 c.
Carson & Colorado R. R. 3 g. 234 m. 6 lo. 134 c
H. M. Yerington, *Gen. Supt*... .. Carson, Nev.
R. J. Laws, *Supt*. (C. & Col.)..Hawthorne, Nev.
Hume Yerington, *Pur. Agt*........Carson, Nev.
I. N. Fording, *M. M*.. ....Carson, Nev.
M. M. Hyde, *M. C. B*........... . Carson, Nev.

W

Wabash, Chester & W'n R. R. (*See St. Louis Coal.*)
Wabash, St. Louis & Pacific Ry. (4 Gen. Divs.,
4-8½ g. 3,241 m. 598 lo. 17,230 cars.
John C. Gault, *2d V. P*...........St. Louis, Mo.
Robert Andrews, *Gen. Supt*.. ..St. Louis, Mo.
R. B. Lyle, *Pur. Agt*.............St. Louis, Mo.
Jacob Johann, *Gen. M. M*......Springfield, Ill.
U. H. Kohler, *Gen. M. C. B*... ....Toledo, O.
(1) Eas'n Div.: G. W. Stevens, *Supt*........Peru, Ind.
J. B. Barnes, *M. M* ....Fort Wayne, Ind.
John McKenna, *M. M*............ Peru, Ind.
Cairo Div.: D. G. Moore, *Asst. Supt*....Cairo, Ill
W. S. Morris, *M. M*................Carmi, Ill
Rant'l Div.: B. F. Mathias, *Asst. Supt*. Rantoul, Ill
J. McCarthy, *M. M*.......... ....Rantoul, Ill.
(2) Middle Div.: H. F. Clark, *Supt*....Springfield, Ill.
B. B. Rose, *M. C. B*..............Decatur, Ill.
F. L. Tomkins, *Asst. Supt*. ....Forest, Ill
F. D. Schermerhorn, *Asst. Supt*.. Quincy, Ill.
(3) Northern Div.: E. N. Armstrong, *Supt*. Peoria, Ill.
C. S. Lape, *M. M*......... ....Tilton, Ill.
R. M. Hemphill, *M. C. B*..........Peoria, Ill.
E. B. Hyde, *Asst. Supt*......... Havana, Ill.
(4) Western Div.: R. S. Miner, *Supt*.....Moberly, Mo.
W. H. Selby, *M. M*................Moberly, Mo.
C. S. Buck, *M. C. B*................Moberly, Mo.
E. Dresser, *Asst. Supt*...........Stanberry, Mo
J. S. Hazen, *M. C. B*.............Stanberry, Mo
D. Moin. Div.: C. F. Meek, *A. Supt*. Des Moines, Ia
Walden's Bridge R. R. 3 g. 23 m. 3 lo. 37 cars.
John G. Scott, *Gen Man* ....Jenks P. O., Tenn.
Walkill Ry. (*See N. Y., West. Sh. & Buf.*)
Walla Walla & Columbia Riv. R. R. (*See Ore. Ry.*)
Walton R. R. 5 g. 10 m. 1 lo. 7 cars.
D. H. Walker, *Pres* ....Monroe, Ga.
Warren & Farnsworth Valley R. R.
3 g. 11 m. 3 lo. 39 cars.
A. D. Wood, *Supt*..................Warren, Pa.
Warwick Valley R. R. (*See Leh. & Hud. River.*)
Wasatch & Jordan Valley R. R. (*See Den. & Rio. Gr.*)
Washington, Ohio & West. R. R. 4-8½ g. 52 m. 5 lo. 87 c.
S. M. Brophy, *Supt*... .... Alexandria Va.
Edward Dunn, *M. M*...........Alexandria, Va.
John Harrison, *M. C. B*........Alexandria, Va.
Waynesburg & Washington Rd. 3 g. 29 m. 3 lo. 26 c.
C. E. Bower, *Supt*.............Waynesburg, Pa.
A. M. Kline, *M. C. B*.... .....Waynesburg, Pa.
Welland Ry. 4-8½ g. 25 m. 4 lo. 147 cars.
William Pay, *Supt*.........St. Catharines, Ont.
Jas. Taylor, *M. M*... ......St. Catharines, Ont.
Wm. H. Pay, *M. C. B*......St. Catharines, Ont.
West End Narrow Gauge Ry. 3 g. 16 m. 3 lo. 13 c.
Rolla Wells, *Supt*............. . St. Louis, Mo.
M. M. Hodgman, *M. M*..........Florissant, Mo
West Feliciana R. R. 4-8½ g. 27 m. 2 lo. 22 cars
J. B. McGehee, *Pr. & Gen. Supt*. Bayou Sara, La.
J. A. Tilton, *M. M. & C. B*.....Bayou Sara, La
W. Va., Central & Pittsb'g Ry. 4-8½ g. 24 m. 4 lo. 114 c.
W. E. Porter, *Gen. Supt*......Piedmont, W. Va
Geo. W. Harrison, *Pur. Agt*...Piedmont, W. Va.
E. W. Lippencott, *M. M. & M. C. B*..Piedmont.
West & East R. R. (*See Ill. Cen.; N. O. Div.*)
West Jersey R. R. (*See Penn. R. R.; (3) Div.*)
Western R. R. (of Ala.) 5 g. 138 m. 15 lo. 270 cars.
Atlanta & W. Point Rd. 5 g. 87 m. 14 lo. 240 c.
Cecil Gabbett, *Gen. Man. & Supt*...Mont., Ala.
C. D. Wall, *M. M*......... ....Montgomery, Ala.
F. M. Wade, *M. C. B* ....Montgomery, Ala.
Western Counties' Ry. 4-8½ g. 67 m. 8 lo. 137 cars.
J. Brignell, *Supt* ....Yarmouth, N. S.
Western Maryland R. R. 4-8½ g. 157 m. 25 lo. 439 c
J. M. Hood, *Pr. & Gen. Man*....Baltimore, Md.
R. J. Adair, *Pur. Agt*........... Baltimore, Md.
David Holtz, *Mast. of Mach*..Union Bridge, Md.
J. H. Nussear, *M. C. B*.. .....Union Bridge, Md.
Western No. Carolina R. R. 5 g. 210 m. 17 lo. 160 c.
V. E. McBee, *Supt*...............Salisbury, N. C.
Jos. P. Minetree, *Pur. Agt*......Richmond, Va.
G. W. Gates, *M. M*.... ....Salisbury, N. C.
Western & Atlantic R. R. 5 g. 138 m. 58 lo. 952 c.
R. A. Anderson, *Gen. Supt*.........Atlanta, Ga.
A. B. Bostwick, *Asst. Supt*........ Atlanta, Ga.
John H. Flynn, *M. M. & C. B*.....Atlanta, Ga
Wheeling, Pittsburg & Baltimore R. R.. (*See B. & O.*)
Wheeling & Lake Erie R. R. 267 m. 31 lo. 1,456 c.
M. D. Woodford, *Gen. Man*..........Toledo, O.
O. P. Dunbar, *Gen. M. M*...........Norwalk, O.
John Hillhouse, *Div. M. M*.........Norwalk, O.
A. Galloway, *Div. M. M*.........Cambridge, O.
Whitby, Port Perry & Lindsay Ry. (*See Mid. of Can.*)
White Water R. R. (*See Ft. W., Cin. & Lou.*)
Whitefield & Jefferson R. R. (*See Bos., Con. & Mon.*)
Whitneyville & Machiasport R. R. 8 m. 2 lo. 48 c.
C. Sullivan, *G. M. & Pur. Agt*. Whitneyville, Me.
Wicomico & Pocomoke R. R. 4-8½ g. 30 m. 2 lo. 38 c.
L. Showell, *Pres*................. ....Berlin, Md.
Williamsport & North Branch R. R.
4-8½ g. 6 m. 1 lo. 2 cars.
B. G. Welch, *Man. & P. Agt* ..Hughesville, Pa.
J. V. Chamberlain, *Supt. & M. M*. do.
Williamstown R. R. 4-8½ g. 9 m. 1 lo. 10 cars.
Samuel Garwood, *Supt* . Williamstown, N. J.
Wilmington, Columbia & Augusta R. R. (*See W. & W.*)
Wilmington & No'n R. R. 4-8¾ g. 85 m. 16 lo. 148 c.
J. H. Thompson, *Supt. & P. A*..Coatesville, Pa.
George Rommel, *M. M*.........Coatesville, Pa
Alex. Maitland, *M. C. B*...... ..Coatesville, Pa.
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W. H. Day, *M. C. B*..............Florence, S. C.
C. R. Clowe, *M. C. B.* (W. & W.). Wilmington, N. C.
Winifrede R. R. 4-9 g. 5 m. 1 lo. 65 cars.
Theodore Wright, *Pres*........Philadelphia, Pa.
Windsor & Annapolis Ry. 4-8½ g. 130 m. 10 lo. 160 c.
P. Innes, *Gen. Man*.............Kentville, N. S.
Wm. Yould, *M. M*................Kentville, N. S.
Wm. Grierson, *M. C. B*.........Kentville, N. S.
Wisconsin Central R. R. 4-8½ g. 480 m. 49 lo. 1,661 c.
F. N. Finney, *Gen. Man*........Milwaukee, Wis.
E. K. Howes, *Pur. Agt*........Milwaukee, Wis.
W. A. Short, *Supt. M. P. & M*...Stevens Pt., Wis.
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Wisconsin & Michigan R. R. (*See Mil. & North'n.*)
Wisconsin & Minnesota R. R. (*See Wis. Cen.*)
Wood River Branch R. R. 4-8½ g. 6 m. 2 lo. 3 cars.
L. M. Barber, *Supt*.......... Hope Valley, R. I.
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Worcester & Shrewsbury R. R. 3 g. 3 m. 3 lo. 9 c.
J. J. Coburn, *Supt*......... ....Worcester, Mass.
G. E. Hapgood, *Pur. Agt*....Worcester, Mass.
Chas. Cleveland, *M. M* ....Worcester, Mass.
Worcester & Somerset R. R. (*See N. Y., Phil. & Nor.*)

Y

York & Peach Bottom Ry. 3 g. 40 m. 4 lo. 62 c.
S. M. Manifold, *Supt. & Pur. Agt*.....York, Pa.
S. J. Williams, *M. M*........... ......York, Pa.
E. K. Williams, *M. C. B*..... ....York, Pa.
Youghiogheny R. R. 4-9 g. 12 m.
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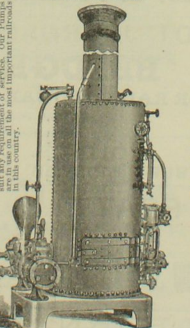

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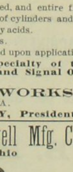

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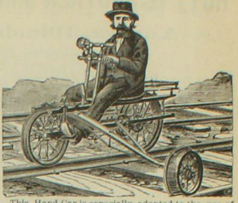

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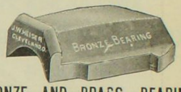
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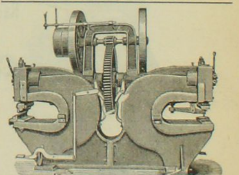

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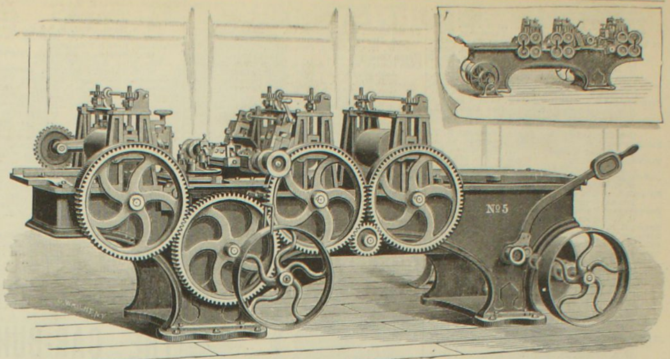

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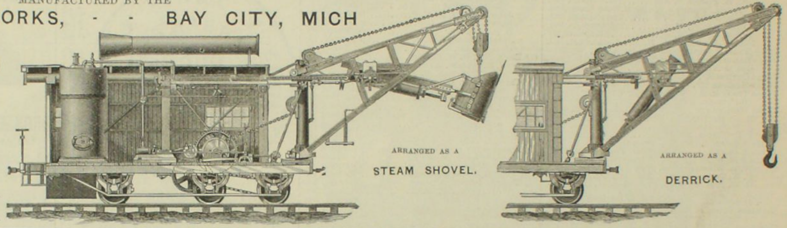

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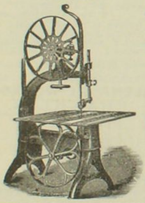

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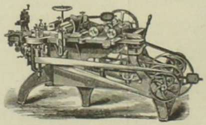

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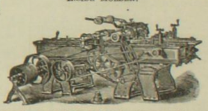

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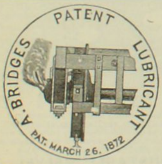

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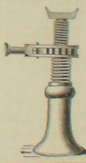

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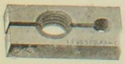

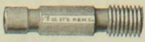

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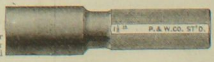

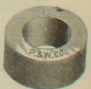

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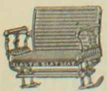

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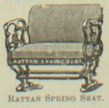

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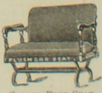

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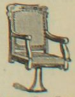

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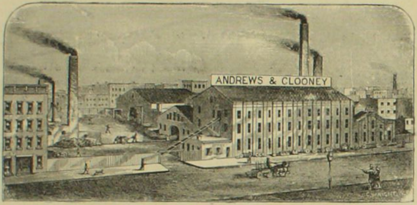

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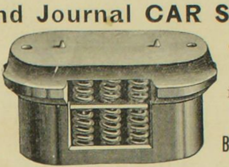

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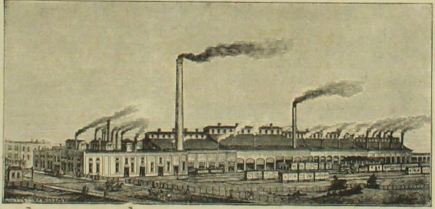

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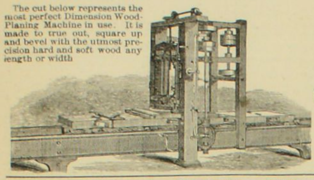

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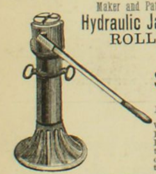

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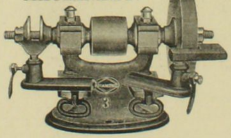

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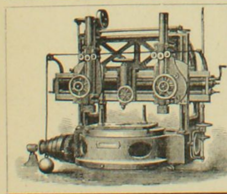

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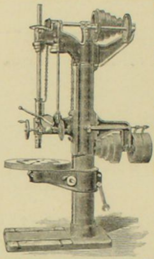

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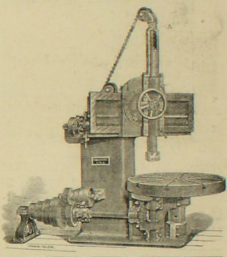

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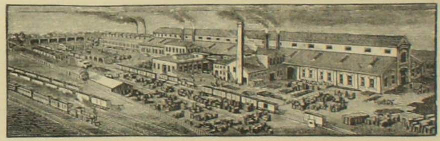

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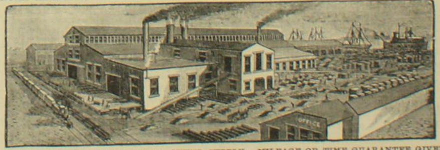

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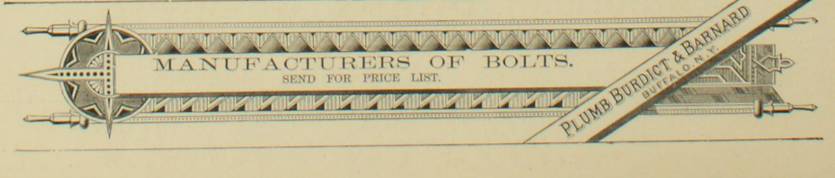

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